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ABSTRACT

The first of two volumes, this book contains complete texts of 61 papers presented at a 1988 symposium on geographical education. The papers cover many aspects of geographical education in several countries in Western Europe, Africa, and Asia, and are divided into eight sections: (1) "Developing Skills for Living through Geographical Education"; (2) "Developing Learners' Skills and Abilities in Geography"; (3) "Curriculum Developments in Geography for the 1990s"; and (4) "Research in Geographical Education"; (5) "Developing Skills through Continuing Education"; (6) "Curriculum Developments in Geography for the 1990s"; (7) "Teaching Styles in Geographical Educations"; and (8) "Developing Learners' Skills and Abilities in Geography." Many of the papers include figures and additional references. (AS)

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SKILLS IN GEOGRAPHICAL EDUCATION SYMPOSIUM '88

Brisbane, August 14 - 20, 1988

SO 020 667

PROCEEDINGS - Volume 1

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SKILLS IN GEOGRAPHICAL EDUCATION SYMPOSIUM '88

Volume 1

Papers presented to the Symposium

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Developing skills for living through geographical education

VIDEODISC, CD ROM AND THE TEACHING OF GEOGRAPHY

John S Emery

ABSTRACT:

The purposes of this paper are to describe current developments in Interactive Videodisc and CD ROM technologies, to evaluate the major applications in geography and geography-related projects, and to consider the likely impact upon the teaching of geography.
The differences between Interactive Video and CD ROM Video are examined, particularly by reference to levels of interactivity. The problems of compatibility, costing and marketing are addressed, and IBM's InfoWindow is described as an example of recent 'state-of-the-art' hardware. Included among the applications evaluated are IVIS Geography Disc, Domesday Project, and Palenque.
Finally, some conclusions, are drawn by reference to the relative pedagogic merits of these technologies, and some projections are made about impending pressures to change teaching styles.

INTRODUCTION:

What is Interactive Video ?

Interactive video is the integration of the best features of video and computer technology. It is the marriage of two technologies, thereby offering in a single medium, a unique blend of visual/textual information and computer assisted learning techniques. Teachers have been long aware of the effectiveness of audiovisual presentation, but in most such presentations the learner has remained essentially passive, receiving information but not necessarily experiencing it. The coupling of video techniques with a microcomputer, however, creates extremely flexible learning situations. Videodisc and CD ROM began as separate approaches to the development of a similar product.

MAIN TEXT/DISCUSSION:

1. Videodisc

The delivery systems for laser videodisc cover a range of possibilities, the main difference being the levels of interactivity: **(1)**

a. Level Zero. This is a straight play domestic system that requires little or nothing from the user. Level Zero players offer forward and reverse motion at variable speeds plus some fast speeds in either direction. There is no direct search facility.

b. Interactive: Level One. In addition to Level Zero features this system offers Search and Automatic Stops. The disc can be stopped at exact frame locations.
c. Interactive: Level Two. This system is designed for industrial and educational applications and contains built-in microprocessors with two forms of memory. One is Frame Recall Storage which allows the storage and retrieval of five-digit frame numbers in any order. The other is Program Storage which allows the creation of CAI programs. Random access time is less than one second for short jumps and up to five seconds for maximum search distances.

d. Interactive: Level Three. All Level Three systems are interfaced with microprocessors. There is a large increase in available memory and high level mathematics functions. CAI is combined with high-quality visuals.

e. **Interactive: Level Four.** This is the highest level of interactivity developed so far. It allows the use of overlaid text, graphics and other visual information from an external computer. This overlay capability, along with input devices such as joysticks, touch screens, bar code readers, light pens, and voice activated systems, can increase interactivity greatly and promote a more efficient means of attaining particular objectives.

It has been suggested that videodisc is a 'misinvented technology' because it was originally intended to recycle old movies to generate income for the motion picture industry. During the 1970s, however, academic professionals located at Massachusetts Institute of Technology, University of Nebraska and the University of Utah, but working independently, realised the educational possibilities within this technology and quickly interfaced it to computers.

In 1978, MCA Discovision published a first catalogue of approximately 200 titles. By 1986, Pioneer had developed a catalogue of nearly 1600 titles, mostly feature films with some educational entries. An Educational Videodisc Directory is now being published through Systems Impact, Inc.

A good example of a 'state-of-the-art' interactive video system is Infowindow.(2) While this product has yet to be formally announced in Australia, it has already been installed for use at Expo '88 in Brisbane, and at the Powerhouse Museum in Sydney. InfoWindow is an integrally designed system that includes a 13" touch-sensitive display screen with 60 user-programmable spots, a control program, a personal computer (PC, XT or AT), and a videodisc player. InfoWindow requires no keyboard or computer skills, and offers the versatility of full-motion video pictures or still video images, on which can be superimposed text or graphics, and to which can be added narration, music or sound effects from either of two audio tracks. With this type of display, a viewer can begin a presentation, select an option, answer a question, even order merchandise simply by touching the screen. The system is supported by a range of authoring software which includes Video/Passage Author, Video/Passage Presentor and Learning System /1. The cost of a basic system (without player) is about US$4,200. When more readily available in Australia, one could anticipate a price of about $A6000.

2. Compact Disc/Read Only Memory (CD ROM)

Compact discs were first developed as digital audio discs possessing high quality stereo sound. CD ROM was then developed for its capacity to store digital data such as text and digitised graphics. Typical applications were encyclopaedias and financial market reports. The first efforts were generally incompatible.(3)

During 1987, CD-V (video) became a reality with CD-I (interactive) due for release in 1988. The industry has moved quickly towards compatibility, and Combi players are now produced for general domestic release in the USA.

Compact Disc Video (CD-V) is both digital video and digital audio in one neat package. It is a redevelopment of the laser discs of the early 1980s, which then attracted only limited commercial attention. In June 1987, at the Consumer Electronics Show in Chicago, more than thirty leading manufacturers banded together to launch CD Video. These companies included CBS Records, Pioneer, Polygram, Paramount, Sony, Yamaha, RCA, Magnavox and HBO Home Video. They are now organised to offer compact disc video players, music videos and movies. The CD Combi player can play every available CD audio and video release, old or new, including old laser disc movies.

Three new formats are now available:(4)

a. A five-inch CD video 'single' that contains about five minutes of music and picture plus twenty minutes of music.

b. An eight-inch videodisc that contains about forty minutes of digital audio and video on both sides, and

c. A twelve-inch videodisc with up to two hours of digital audio and video, similar to the old laser discs.

The five-inch video singles are expected to cost between $A6 and $A8, the eight-inch approximately $15 and the twelve-inch about $25. The CD video players will range from $A800 to $A1200, with prices falling as they become more popular. As with any innovation, however, the customers will have the final say, and success or failure will ultimately depend upon consumer response. From an educational perspective, one would hope that a substantive consumer market does emerge, as this will be the only way that prices will then fit the budgets of educational organisations, particularly individual schools. The scene could then be set for the development of an incredible range of educational software, both new and revised, to fit this new and exciting CD video technology.

3. Applications Relevant to Geography

a. IVIS Geography Disc

While a number of interactive video productions include geographical materials, there is one that stands out in terms of geography curiculum, and that is The Geography Disc, part of the Interactive Video in Schools Project (IVIS). This project was funded by the U.K. Department of Trade and Industry, and commenced in January 1986. The Geography Disc is the brainchild of David Walker and Julia Duckworth, both staff members of the Geography Department of the University of Loughborough, England.(5) It is a two-sided disc containing archival material from a variety of sources, including movie film, video, slides and maps. The material on Side 1 covers two topics, Weather and Hydrology. The weather units include elements, systems, charts and photographs, physics and human activity. The hydrology units include water stores, the water cycle, water on the ground, and water and Man. The material on Side 2 covers a topic entitled The Changing World, and includes water supply problems, drought, aid, agriculture, urbanisation, city structure, transport and industry.

The commentary on the disc is aimed at GCSE level (about age 16). It is possible, however, for the disc to be used across the whole secondary age range in any topic designed by the teacher, and this could apply not only to Geography but also to Integrated Studies, Humanities, World Studies and Religious Studies.

The software allows several approaches, e.g., the orthodox presentation of material as obtained through the Menu or Index; the design of lesson packages with linked support material; and more importantly, self-directed learning by students who can build their own files from the software.

The Geography Disc is a pioneering venture in the archival storage of visual, mainly pictorial images. It will certainly be remembered as a benchmark in geographical education research, but it is unlikely to find a commercial market because of the many copyright problems that it would create. Most of the material has been supplied only on the understanding that the investigation would be for research and development purposes. Furthermore, the way in which the material has been collected and collated in this particular project reveals the somewhat eclectic approach taken to the research, and this, in turn, has led to a rather disorderly form of classification. With the possible exception of some aspects of the Design Disc, the Geography Disc appears to be the only IVIS Project to have followed a purely archival format.

The other seven projects followed different formats.(6) Life and Energy, the ecology disc for primary and middle school science, adopted an investigative approach, while Modern Languages Project was based on a linear video approach cleverly set in a cartoon-type, town backdrop. Challenges, the Northern Ireland videodisc, consists of a series of short dramatised scenes and a collection of 500 purpose-taken slides. The IV in Mathematics teaching, entitled the School Disco, is set in an environment readily accepted by most teenagers, and it is also designed for use at several levels. The Design Disc is strongly skills-oriented but also contains information sequences based on commercial products and some 2000 slides for reference and stimulus. Missing the Obvious, Primary Education and the Child is the first in a planned series for in-service teacher training. Relevance and reality are the central themes and all information has been specifically photographed. Finally, the Moray House disc aims to capture several features of The Primary Development Environmental Education Studies Program (PDEP) by focusing on a physically-oriented river study and the social aspects of urban development. The in-house expertise of the Moray House College of Education television department has been fully utilised.

These eight discs form the Interactive Video in Schools (IVIS) Project, which was conceived with the purpose of investigating the potential of this new resource. Its broad aims were;

- 'to investigate the potential of IV as a teaching and learning resource for schools;
- 'to facilitate the development of IV design skills within the education sector;
- 'to explore the practical aspects of implementing IV technology in schools;
- 'to disseminate the results of the experience.

It should be noted that there was no original intention to create a commercially viable product at this stage.Almost one hundred schools have been used in the trialling and piloting aspects of this investigation which has been centred on the University of East Anglia. The packages have been designed to run in conjunction with existing micros in schools, namely, the Acorn Series and the RML Nimbus. Each package will be available for both machines, and a version will also be available for the more advanced Domesday system, now spreading rapidly into British schools.

b. The Domesday Project

It is difficult to place a subject tag on The Domesday Project. Its title, and the fact that it is a response to an anniversary of an event that took place nine hundred years previously (The Domesday Book of 1086) suggests that it is essentially an historical document. In essence, however, it is a 'snapshot' in time of a particular place - the United Kingdom. Perhaps, to the purist, it is an essay in historical geography, for that is what it will undoubtedly become. Whatever it is, it contains a wealth of visual information for the geographer, the geography teacher and the geography student. And, given the United Kingdom as a nation has long accepted Geography as a serious disciplinary study, one could have expected a project such as 'Domesday' to contain a sound geographical orientation.

By reference to the technical data about The Domesday Project, it is sufficient to state that it is the result of a BBC initiative, particularly well-managed within a two-year period, which resulted in the production of two interactive videodiscs on LV-ROM format. They contain 324 Mbytes of digital data and 54,000 analogue video frames. To play the discs, however, one requires a hardware package that includes a Philips 415 LaserVision videodisc player, an Acorn Master Turbo microcomputer with trackerball control and an RGB analogue monitor. The total package, including the two discs, costs Pounds Stg 3500 plus VAT (about $A9000 plus tax). It is clearly an expensive item of modern technology , and more especially for purchasers outside the United Kingdom. Subsidies up to Pounds Stg 700 exist for schools in the UK, where sales have exceeded all expectations in the first year.

The National Disc, the first of the two discs in the Project, is a substantial video record of Britain in the 1980s, with information organised into four main groups, viz., Culture, Economy, Society and Environment. As might be expected, the Environment segment is strongly geographical with references to landscape, climate, soil, oceanography, wildlife, agriculture, ecology, energy, water resources, pollution, conservation and urban settlement. The second disc is called the Community Disc, and it is almost totally geographical in its organisation, being based on some 24,000 Ordnance Survey maps arranged in six levels, with text and photographs available at each level. The levels vary from general maps of the United Kingdom through to floor plans of special sites.(7)

One can enter the system at any level by typing a place name, a regional description or a grid reference, or by using the trackerball to move a pointer on the screen. This provides access to 150,000 screen pages of text and 20,000 photographs.

The Domesday Project has been described as 'a journey of exploration'.(8) For schools and colleges, it provides a discovery-learning system on a scale never previously imagined. It is a nationwide, multi-level, multi-media collection of facts and images, visually clear, and organised for rapid access. Most importantly, it makes learning an enjoyable experience. It represents the most ambitious interactive videodisc program so far undertaken.

Like the IVIS Project, it will become a benchmark in multimedia history. Unlike the IVIS Project, however, 'Domesday' does not permit the introduction of additional data through the computer. All the information is on the discs and cannot be updated. This is not so much a fault in the system as a feature of the design philosophy. It would not have been a Domesday-type' of record if it could be changed. Faults, of course, have been found in the design of 'Domesday', and some of these are recorded as follows:

i. The project is based on a dedicated and expensive hardware system. This limits its portability and its flexibility.

ii. There are significant gaps in the data. This is most obvious on the Community Disc, where the material has been gathered by primary and middle school children. Some of it is anecdotal. However, the educational value of the method of gathering the data must be applauded. The seriousness of this criticism will be dependent upon the expectation of the user.

iii. There is no doubting the excellent use made of the pictorial and graphical features of videodisc technology. A more concerted effort, however, could have been made to exploit the available computer features, e.g., of sorting data, of spreadsheat manipulation, and of simulating such things as population growth from the base data included on the disc. One can anticipate these types of features being built into later developments, e.g., the BBC Ecosystem Project, or the Australian Domesday Project.

iv. The design of the interface is technically conservative, e.g., the extensive use of menu systems particularly when using the 'National Disc'. There is scope for the development of more technologically advanced 'short-cuts' and greater sophistication.

c. Palenque

Palenque is a Research and Development project undertaken by Bank Street College of Education, New York City.(9) Kathleen Wilson is the Director of a project which was originally funded by RCA, but is now controlled by General Electric. This project is an interactive multi-media optical disc research prototype that has been developed for 8 to 14 year-old children and their families, to use at home. Palenque is probably best described as a Social Studies investigation with specific inputs of History and Archaeology. As Palenque is a place, and part of a the former Mayan civilization in Yucatan in Central America, it contains much that can be considered geographical. The site was chosen because it was originally used in 'The Voyage of the Mimi', a children's television show produced by Bank Street College. It is also a spectacular location with many reconstructed Maya temples, surrounded by a dense tropical rainforest near the foothills of the Guatemalan Highlands.

This interactive prototype allows children, by the use of a joystick, to take a self-directed 'walk' around the ancient Maya site, through nearby rainforest, or through a simulated Palenque Museum database. The design allows children to browse freely, making choices about what to see, when, and where, and to discover things along the way as they explore.

Because Palenque is a research effort rather than a product development effort, it has beeen possible to experiment with the nature of the design as well as the design process itself. Attempts have been made, therefore, to incorporate many interactive learning formats in this particular disc. Palenque is not a step-by-step instructional sequence. At its core is a data base which includes information stored in a variety of formats (graphics, text, sounds, narration, slides, motion video) and organised to foster browsing rather than precise searching. The browsing is structured implicitly in two ways; firstly, in a spatial, or geographical way by a virtual travel component, where the user 'walks', e.g., to a temple to find out information about that temple; and, secondly, in a topical way by a 'museum' component that contains four theme rooms. One can walk around the site, by map and by camera, and one can walk through the rooms of the museum.. An inbuilt, technological innovation is the ability to make 180 degree turns. Interactivity is built in through menus and ikon bars. A young boy acts as the main guide, and he is supported by two adult friends, who are archeologists. Palenque also has elements of simulation, interactive games and books, and linear television narratives, all accessible through an intuitively simple interface.

Pedagogically, Palenque is superior to The Domesday Project. It has experimented more positively with creating an interactive, multi-media information environment for children, and their families, that encourages curiosity and fosters self-guided exploration, information-seeking and decision-making. Its design philosophy is more akin to the learning ideas of Bruner, the 'spontaneous learning' situations described by Vygotsky, and the ideas of Piaget regarding the natural ways that thought develops.(10)

Technically, the project is brilliant, and this is due to the back-up provided by the David Sarnoff Research Centre (formerly GE/RCA Laboratories) in Princeton, New Jersey. Palenque has been designed, in part, as one of several demonstration applications for DVI technology (Digital Video Interactive, General Electrics Copyright, 1987). DVI has been under development for several years at the David Sarnoff Research Centre and was introduced at Microsoft's CD ROM Conference at Seattle in March, 1987. It is an integrated video and graphics technology that provided digital full motion, full screen video, three-dimensional motion graphics and high quality audio capabilities from a single CD ROM disc.

One of the priorities in Palenque is the effective use of full motion video. This can be seen in segments that show howler monkeys playing in the rainforest canopy and aerial passes over the Palenque site. Other features of the DVI system are the capability of continuous audio and video information with no noticeable search time; multiple moveable video windows; user control of video information, e.g., pans and tilts; and user control of multiple channel, high quality audio information. These features are incorporated into Palenque to produce the virtually seamless travel sequences and branches; the camera tool which allows children to take a picture by digitizing and reducing a selected frame from the disc; the album which allows children to place digitized and reduced camera images side by side for comparisons on opposite album pages; a 'magic flashlight' which allows children to dissolve between digitized historical photographs of Palenque and current photographs of the same locations; a digitized and unwrapped fish-eye pan and tilt which allows children to see 360 degree views from various locations, and a rainforest symphony game that allows children to create their own multi-track symphony of sounds selected from pictures of objects and animals that create those sounds.

Kathleen Wilson and her team have now spent more than two years in a research and development mode that has married the best of pedagogy and technology. It is unlikely, however, that Palenque will ever be distributed widely, unless there is a change in company policy by General Electric, as this organisation is more involved currently in defence considerations than educational applications.

Presently, the system is highly customized including a Sony LDP 2000/2 laser video disc player, an IBM PC-AT computer with extended memory, an

AT & T Targa Graphics Board, a custom digital audio board, an IBM monitor, a 20" RCA stereo colour set, and a Gravis joystick. Such a complex of equipment puts the project beyond the cost-benefit calculations of most education systems. With the advent, however, of the CD-V Combi player, the experimental outcomes of Palenque may form a platform for the development of many innovative and affordable educational applications.

CONCLUSIONS:

A Council for Educational Technology (CET) working party in England has identified four relatively distinct modes of use for Interactive Video in schools, viz.,

1. as a class teaching tool by the teacher;
2. as a small-group learning medium;
3. for individualized learning; and
4. as a resource for data access by groups and individuals. **(11)**

Each of these modes is applicable to the teaching of geography. As geography is concerned essentially with the study, from a spatial perspective, of people in relation to places; and because the visual, especially the pictorial, is an excellent means of recording real people, real places and the real world, the new technologies of IV and CD ROM are particularly well suited to the teaching styles of this subject. Picture quality, instantaneous access, extensive disc capacity, computer linkages, and greatly enhanced opportunities for interactivity and flexibility are only some of the more obvious advantages for teaching geography.

Early studies on the pedagogic merits of IV and CD ROM, however, indicate that these new applications will not become the panaceas for all learning needs; they are not cheap; and quality software is not easy to produce. **(12)** Even in schools where funded research programs are in operation, it is accepted that only rudimentary developments have taken place so far by reference to indexing, accessing and authoring of software. These new visual applications are interesting and challenging, but that does not reduce

> "the need for teachers to monitor continually the effects (of these applications) and to share their findings with geography teachers and other colleagues."**(13)**

There is no doubt that IV and CD ROM will ultimately become valuable additions to the available store of visual resources for most subjects and many teachers. Unfortunately, teachers generally under-utilise existing visual resources , and most of the teachers who do use them do so as adjuncts to more formal methods of teaching.**(14)** If the quality of geography teaching is to improve further, there is an immediate need to encourage teachers to integrate resources -and here a special plea is made for visual resources- into the mainstream of their teaching styles, i.e., to consciously include relevant resources into their lessons, to build their lessons more appropriately around such resources, and to develop in children skills in using those resources.

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CIVIC EDUCATION THROUGH GEOGRAPHY: AN EXPERIMENTAL STUDY

Yee-wang Fung

ABSTRACT

This is an experimental study involving fourteen secondary school classes. The pupils in each class were taught a lesson built around a game on grid reference and conventional signs. The game was played under three different styles of leadership, namely authoritarian, democratic and laissez-faire. After the lesson, the pupils were asked to answer a questionnaire which attempts to find out their interest in the game and their understanding of, and attitudes towards, the different styles of leadership and to do a short test on the subject matter. Their responses are analysed and reported in this paper.

INTRODUCTION

Since the publication of 'Frontiers in Geographical Teaching' (Chorley and Haggett, 1965), there has been a gradual shift in the emphases of geographical education in the English-speaking world. School geographers' attention was first diverted from regional studies to quantitative, hypothesis-testing and model-building methods in the seventies, and further geared towards phenomenological, humanistic and radical approaches in the eighties (Graves, 1984, 7-64; Wiegand, 1986).

Concomitant with these developments is a steady increase in the importance attached to values education in the teaching of geography. Values may be classified as behavioural, procedural and substantive. It has been pointed out by Fenton (1966, 41-45) that teachers should teach about substantive values but not the values themselves. Other educators, such as Lawton and Dufour (1973, 32-38), however, believe that there are certain substantive values which the schools have a duty to transmit. The practice of democracy is one of them.

Over the years, strategies have been developed to help pupils acquire values. These include the values clarification strategy (Raths et al, 1966), the values analysis strategy (Metcalf, 1971), and the values enquiry strategy (Hart, 1982).

Recent years have witnessed a rising demand for a more democratic government in many developing areas or countries. The Hong Kong Government, for example, responded by encouraging schools to provide civic education through curricular as well as extra-curricular activities (Secretariat, 1984; Education Department, 1985) as it recognizes the fact that democracy can only be fully realized if pupils are given opportunities to learn about it and to practise it in school.

It has been claimed (Fung, 1988) that it is possible to teach democracy in a geography lesson on a seemingly value-free topic, namely, grid reference and conventional signs, by using an experiential approach. The present study is an attempt to verify this statement.

METHODOLOGY

A lesson built around a game on grid reference and conventional signs for twelve-year-old pupils at the Form 1 (Year 7) level was designed and tried out by the author in June 1987 which was video-taped. After reviewing the trial lesson, the original design was slightly modified. The revised plan, described in some detail elsewhere (Fung, 1988), consists of the following five major steps:

1. Motivation (5 minutes) : arousing pupils' interest in maps;
2. Development (15 minutes) : teaching the pupils conventional signs and grid reference;
3. Consolidation (10 minutes): drilling the pupils;
4. Application (20 minutes) : running a competitive game for the pupils which is played under three different styles of leadership;
5. Conclusion (15 minutes) : discussing with the pupils the pros and cons of the three different styles of leadership.

After the lesson, the pupils are asked to answer a questionnaire and do a short test. This exercise, to be completed in about ten minutes, is conducted after a break of a few minutes or in the following geography lesson.

The game is played in groups of five. In a class of forty, only six groups actually participate in the competition, with every two groups playing under one of the three different styles of leadership, namely authoritarian, democratic and laissez-faire respectively. The rest of the class, about ten in number, act as observers and referees.

Sixteen practising teachers drawn from different schools, producing a fairly representative sample, were invited to participate in the research. They were asked to teach grid reference and conventional signs to a Form 1 class in their own schools in late September or early October, using the revised lesson plan described above. A two-hour briefing session was organized for them in mid-September during which the procedure was explained, the video-taped lesson was shown and the teaching materials were distributed. They were asked to return the score-sheets of the game and the completed questionnaires and tests in October together with a report of the lesson. Two schools were discarded because according to their reports the teachers did not follow the plan closely enough in conducting the lesson.

The results were then analysed to find out:

(1) how the three groups of pupils performed in the competition;

(2) how interested the different groups of pupils were in the game;

(3) how much they learned about grid reference and conventional signs;

(4) the extent to which they understood the differences among authoritarianism, democracy and laissez-faire;

(5) the attitudes they held towards democracy.

RESULTS

The data show that democratic groups tend to obtain higher scores than laissez-faire and authoritarian groups in the competition (an average of 10.536 marks out of a total of 15 as compared to 10.286 and 9.464 marks respectively), whereas authoritarian groups tend to take less time to complete the task than laissez-faire and democratic groups (an average of 7.683 minutes as compared to 8.446 and 8.817 minutes respectively). The differences, however, are not statistically significant.

Table 1 shows that the participants found the game quite interesting, their average combined score being slightly above the mid-point. The democratic group tends to score more highly than the laissez-faire and authoritarian groups in each of the three 5-point scales designed to measure their interest in the game and their behaviour and feeling during the game respectively. The differences between the authoritarian and democratic groups in the scores for feeling and in the combined scores are significant at the 0.05 level of confidence.

Table 1: COMPARISON OF PUPILS' INTEREST IN THE GAME: GROUPS UNDER DIFFERENT STYLES OF LEADERSHIP

		Authoritarian	Democratic	Laissez-faire	Observer	Analysis of variance
Did you find the game interesting? (interesting-uninteresting)	N	139	136	137	65	F=2.885*
	M	2.971	3.243	3.212	2.769	df=3/474
	SD	1.398	1.232	1.245	1.086	
How did you behave during the game? (attentive-inattentive)	N	140	137	138		
	M	3.464	3.708	3.565		F=1.945
		(3.154)	(3.538)	(3.231)		df=2/412
	SD	1.147	0.876	1.067		
How did you feel during the game? (interested-bored)	N	139	137	138		
	M	3.194	3.591	3.341		F=3.732*
		(3.196)	(3.647)	(3.216)		df=2/411
	SD	1.301	1.148	1.205		
Combined score	N	138	136	136		F=3.286*
	M	9.609	10.522	10.103		df=2/407
	SD	3.227	2.675	2.922		

*Significant at 0.05 level of confidence.
Figures in parentheses are those reported by the observers.

Table 1 also shows that pupils who participated in the competition found the game more interesting than the observers. Their difference is significant at the 0.05 level of confidence. Table 2 compares the combined score of the leaders with that of the non-leaders. In the laissez-faire group, leaders are defined as those who contributed four or more answers in the competition. The leaders obtained a higher combined score than the non-leaders and their difference is significant at the 0.01 level of confidence.

Table 2: COMPARISON OF PUPILS' INTEREST IN THE GAME: LEADERS AND NON-LEADERS

		Leaders	Non-leaders	Analysis of variance
	N	76	334	F=6.927**
Combined score	M	10.961	9.874	df=1/408
	SD	2.693	3.009	

**Significant at 0.01 level of confidence.

The pupils' performance in the test was barely satisfactory: the participants scored 4.058 out of a maximum of 10 and the observers, 3.875. Evidence seemed to show that the democratic group did slightly better than the authoritarian group, who in turn was a little more superior to the laissez-faire group, but the differences are not statistically significant. It also seemed that boys did better than girls and leaders did better than non-leaders, but again the differences are statistically insignificant.

With regard to the pupils' understanding of democracy, the participants and the observers respectively scored 2.251 and 2.161 out of a total of 3 on the objective test and, 3.749 and 3.678 out of a total of 5 on the subjective self-evaluation. In both cases, the differences are statistically insignificant, and there were also practically no differences at all among the three groups of participants.

Table 3 shows that as far as leadership is concerned, pupils in the democratic group felt more satisfied than those in the laissez-faire group, and the latter in turn felt more satisfied than those in the authoritarian group. While the difference between the authoritarian group and the laissez-faire group is significant only at the 0.05 level of confidence, their differences with the democratic group are significant at the 0.01 level of confidence. It may be noted that the score for the authoritarian group falls quite far below the mid-point, showing that these pupils were in fact rather dissatisfied with the leadership they experienced.

Table 3: COMPARISON OF PUPILS' SATISFACTION WITH THE LEADERSHIP: GROUPS UNDER DIFFERENT STYLES OF LEADERSHIP

		Authoritarian	Democratic	Laissez-faire	Analysis of variance
Satisfaction with the leadership	N	137	137	138	
	M	2.569 (2.573)	3.628 (3.654)	2.949 (3.288)	F=20.888** df=2/409
	SD	1.418	1.317	1.385	

**Significant at 0.01 level of confidence.
Figures in parentheses are those reported by the observers.

When the pupils were asked to name the style of leadership they would prefer, democracy naturally emerged as the most popular. It was chosen by 81.7% of the observers, 76.8% of the authoritarian group, 76.1% of the democratic group and 72.7% of the laissez-faire group. As expected, authoritarianism was the least popular. It was chosen by only 6.0% of the pupils.

DISCUSSION

Although the differences found in the present study regarding the performance of the three groups in the competition are not statistically significant, they did serve to demonstrate to the pupils in the classroom the pros and cons of democracy vis-a-vis authoritarianism and laissez-faire and help them understand these three concepts better. Through personal experience and open discussion, the pupils not only acquired a better understanding of democracy, but also developed a more favourable attitude towards it. Thus, while the pupils in the democratic group were very satisfied with the leadership they experienced, those in the authoritarian group felt otherwise with theirs.

Although most of the pupils found the game interesting, those in the democratic group found it more interesting than the others. They were followed by the laissez-faire group, the authoritarian group and the observers in that order. This order seems to correspond with the degree of involvement of each group in the game. It is obvious that the pupils in the democratic group were the most involved in the game and the observers the least. This being the case, the finding seems to provide some evidence to substantiate the claim that involvement breeds interest. The fact that leaders found the game more interesting than non-leaders further confirms this assertion as the former were obviously more involved in the game than the latter.

There are also indications that the degree of involvement is to some extent related to the outcome of learning in a positive direction. Although some of the findings are not statistically significant, they do point to the fact that leaders tended to do better than non-leaders and participants tended to do better than observers in both the questionnaire on understanding of democracy and the test on knowledge of grid reference and conventional signs.

Compared with those in the pilot run, pupils in the present study obtained lower scores in the test and higher scores in the questionnaire. There are three reasons for this: (1) the school used for the pilot run was an above-average school; (2) the pilot run was conducted at the end of the academic year whereas the main study was conducted at the beginning of the academic year; and (3) in the pilot run, the questionnaire and the test were administered immediately after the game, but in the main study they were administered after the lesson.

Finally, it may be noted that the self-evaluation of the participants with regard to their behaviour and feeling during the game as well as their satisfaction with the leadership corresponds very closely with the evaluation made by the observers. This probably is an indication that the results obtained in the present study are quite valid and reliable.

CONCLUSION

The findings in this experimental study confirm that it is possible to teach democracy in a geography lesson on a seemingly value-free topic by using an experiential approach. It was found that the pupils did learn something about democracy as well as grid reference and conventional signs in a lesson built around a game which was played under three different styles of leadership.

The amount of learning on grid reference and conventional signs that took place was only moderate in absolute terms. However, there is insufficient information to determine at this stage whether the method used is an effective one for transmitting knowledge or not (Carstensen, 1987). It should be interesting to compare the achievements of these experiential groups with those of the groups taught by the more conventional methods.

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LIVING CONDITIONS IN THE LOCAL SOCIETY : THE PUPILS WORK.

"INFA" PILOTPROJECT NOV. 1987 - JUNE 1988.

Tonny Hübbe.

The take off for the pilotproject concerning use of computers, application programs and network (local and international) in the classroom in connection with the topic "Living conditions in the local society" was in Nov. 1987.

Before the work in the experimental classes started some preparatory work had to be done. This work consisted in

- in-service training for teachers.
  The in-service training was built up of some very different elements in order to cover every demand existing on beforehand and demands comming up during the work with the topic.
  It stretched from how to use the computer, the use of application programs, calculation in different programs, presentation of statistical sourses,to how to messure weather variables, reading weathermaps, mapreading and interpretation.
- meetings with the teachers discussing the organizing of the work in the classes.
- meetings on every single school in order to select from the broad framework those parts which fit the actual local society and the actual class.(An outline of the framework is given in T.H.: Local studies and the use of general application programs in ordinary classroom geography fig. 7, in Skills in Geographical Education. Brisbane 1988.)
  At these meetings some of the sequences were planned in details.

The goal for the work was and still is, that the pupils

- should get more knowledge about and insight into the living conditions in the pupils own local society and in the society to which the school they collaborate with belongs.
- should be able to communicate the results of the studies about their own society including the local weather to pupils in collaborating classes inside and outside Denmark.

The pupils' tasks in connection with the topics were

A: in the first place to investigate, describe and explain the living conditions in their own local environment and to put these results into a broader Danish context and secondly communicate the results to their collaborating classes in Denmark and UK.

B: the Danish pupils have to investigate the local society of the collaborating English school before they study the results and data received on datafiles from the English class

C: to compare the results and data on the datafiles received from the English class with the results of their own study in order to supplement and correct it.

Re.A.

The sources and tools for the study have been
- data collected during fieldwork of different kind in the local society and environment.
- a 4-cm topographical map covering the local environment.
- local statistics.
- planning reports of the parish or muncipality.
- instruments for weather observations.
- personal computers with application programs such as archives, spreadsheets and text-processing programs and datafiles concerning statistics about population, land use, housing etc. on local, borough and county level.

Educational objectives were defined through the framework and stretched from observations about local service level and recreational demands of the population compared with the local recreational supply to the geomorphological origin of the landscape beneath the "noise" from the land use especially from the built up areas. Within two whole weeks continuous measurements about the weather have been carried out.
During the pupils investigation,measuring, creating the description and attempts of explanation the initial problems of the local society have been discussed and possible causes and solutions suggested.
In order to communicate the results of the study to classes in other parts of Denmark and in UK (the Stockport area) the pupils have to equalize their results in a way that they fit into datafiles for archive programs and spreadsheets. All written materials must be translated in order to allow the communication with English pupils.

These last activity forms a link to the next objective.

Re. B.

The framework for the work was presented to the teachers in the middle of feb. 1988 together with sources and teaching materials. (For the suggested framework see fig.1) The work in the classes will start on some schools in the beginning of March on others after Easter.

Three central geographical concepts are steering the arrangment of the content about the Stockport area and the Northeast-region in UK. The concepts are: locating, changes and living conditions.

The sources and tools for the investigation are
- a 2-cm topographical map of Greater Manchester
- different atlases
- some pages from English geography textbooks concerning the

Manchester-region, the early industrialization and the rise and decline of the textile manufacturing.
- slides showing the city center of Stockport with the communication system, shops and services.
- slides showing different types of housing.
- a database containing data from the 1981 census. Data are broken down on wards. The database runs in Archive Assistent and Report Assistent.
- a pupils users guide to the database - written in Danish.
- exercises using the database to highlight the living conditions in the Stockport area at present.

In the classes this unit will be taught in an even closer cooperation between the geography teacher and the English teacher than has been in the former unit about the pupils own local society.

Re. C.

Unit C can't be described for the time being because the content and organization will be depending on the results of unit B and on which informations and data the files comming from the English schools will include.

As showed in the description of the pupils' work with the units computers and application programs have been used as tools and sources in close connection with traditionel tools and sources.The aim of the project is not to try out various closed programs or how to handle use of computers in the classroom but to investigate where and in which way computers and programs can be used by the pupils in geography and social sciences in order to promote learning and further their solution of problems.
Fig. 2 can be considered as an outline of the units.

Evaluation.

The evaluation of unit A is going on for the time being . The results of the evaluation will be given in the oral presentation of this paper.
Observations in the classroom as reported by the teachers show that pupils in the agegroup from 12 to 15 are interested in investigating their own local environment concerning living conditions. It also shows that they are able to use computers and application programs in order to make investigation and in order to communicate with other classes even in a foreign language. Another positive event has been that some of the slow learners have made progress as regards written account.
The evaluation of unit B and C will take place in May and June 1988 and the results will be presented at the symposium in August.

Fig. 1

Proposal for the teaching framework

Stockport - profile of an English town

Foreign language + Geography/Social sciences

I Introduction

Content, topics/terms:
Where in the world are we?
Administrative classification.
Slides-show which gives pupils a first-hand impression of Stockport.
Reading of text/texts which give informations about the development of the Manchester area, the beginning of the industrialization and the growth and decline of the textile industry.
Outlook to India and other developing countries.

II Localization

Content, topics/terms:
Localization of Stockport (River Mersey).
Localization of Stockport compared to Manchester.
Localization of the Manchester area in UK.

Comparisons with own community and the whole Denmark.

III Changes

Content, topics/terms:
Localization of the textile industry "Yesterday and today".
Stockport: changes from "independent" textile industry to living and industrial quarters of Greater Manchester.
Employment activity rate.
Industrial structure.
Commuting.

Comparisons with own community and the whole Denmark.

IV Living conditions

Content, topics/terms:
Living standard - living quarters.
Size of family and structure of age groups.
Social groups.
Industrial quarters including service.
Commuting and net of communication.
Recreational areas.

Comparisons with own community and the whole Denmark.

The Royal School of Educational Studies
Dept. of Geography, Febr. 1988
Tonny Hubbe

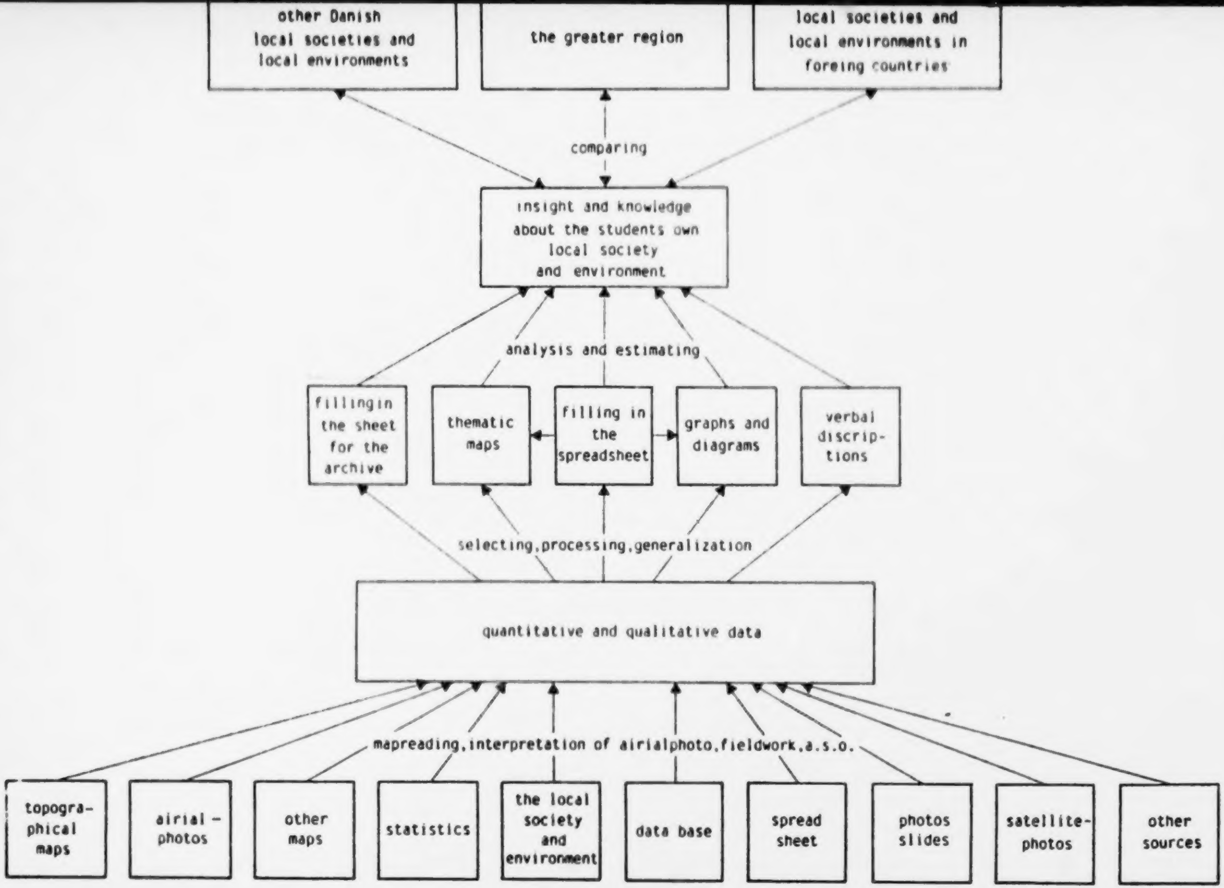

other Danish local societies and local environments
the greater region
local societies and local environments in foreing countries
comparing
insight and knowledge about the students own local society and environment
analysis and estimating
fillingin the sheet for the archive
thematic maps
filling in the spreadsheet
graphs and diagrams
verbal discrip-tions
selecting,processing,generalization
quantitative and qualitative data
mapreading,interpretation of airialphoto,fieldwork,a.s.o.
topogra-phical maps
airial - photos
other maps
statistics
the local society and environment
data base
spread sheet
photos slides
satellite-photos
other sources

Figure 2. Outline of Units

THE USE OF COMPUTERS IN ENVIRONMENTAL STUDIES
weather observations and satellite images

Keld Juhl Larsen

Weather and climate is a common subject in the teaching of geography on different levels in the Danish comprehensive school (Folkeskolen).

It often contributes to the descriptions of conditions of life various places in the world. In recent years weather and weather observations also contribute to environmental studies where topics as air-pollution, acid rain and devastation of forests are dealt with.

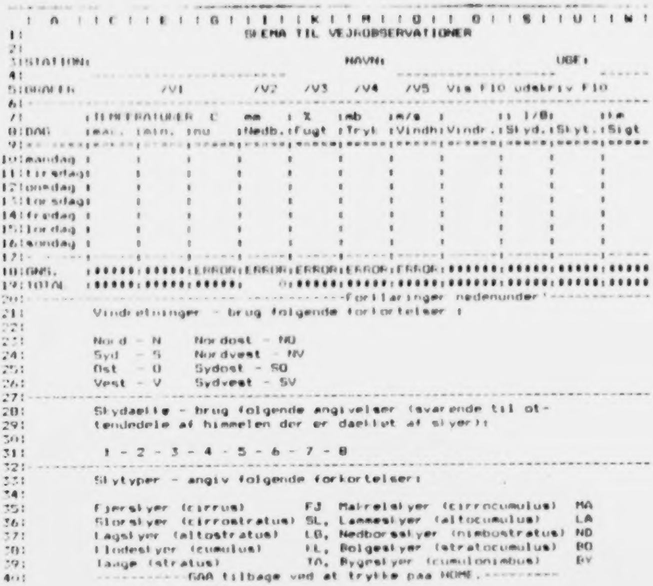
In the 6th to 7th grade the pupils carry out measurements and observations of a number of parameters: temperature, precipitation, humidity, air pressure, speed of wind, wind-direction, cloudiness, type of clouds and sight.

Working practically in the class, one soon experiences the imperfection of measurements carried out by the pupils, partly caused by the fact, that they only make observations once or twice a day and that observations in weekends are totally left out.

In this situation an automatic weather station will prove useful. It can pick up data at fixed intervals during a longer period. A good knowledge of the parameters dealt with in the weather observations is a necessary pedagogical condition for pupils to benefit from such automatic observations. They must be familiar with concepts as humidity, temperature, pressure etc. They must know about changes in the weather caused by changes in the air pressure etc. etc.

Thus the students must have carried out preparatory studies in measuring with manual instruments and adjacent explanations from the teacher. At this stage of teaching, the computer will come in handy. By using a spreadsheet the pupils easily can organize and present their observations in schedules and different types of diagrams. In this way, the pupils will easily be able to illustrate and compare data.

If Danish pupils can gather meteorological information from a meteorological station placed in e.g. UK, they will have an outstanding opportunity to acquaint themselves with weather situations in larger scale. A local automatic weather station can provide information quicker than the traditional sources at the official met. stations, because the delay in time before these - of course more precise data - reach the public



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  !  A  !  ! C !  ! E !  ! G !  ! I !  ! K !  ! M !  ! O !  !  O !  ! S !  ! U !  ! W !
 1:                              SKEMA TIL VEJROBSERVATIONER
 2:
 3:STATION:                                  NAVN:                      UGE:
 4:       ---------------------                    ----------------------  ------
 5:DATO:          /V1         /V2   /V3   /V4   /V5  Vis F10 udskriv F10
 6:-------------------------------------------------------------------------------
 7:       :TEMPERATUR  C    mm    : %   :mb   :m/s  :       :: 1/8:       :km
 8:DAG    :max. :min. :nu   :Nedb.:Fugt :Tryk :Vindh:Vindr.:Skyd.:Skyt.:Sigt
 9:-------:-----:-----:-----:-----:-----:-----:-----:-------:-----:-----:-----
10:mandag :     :     :     :     :     :     :     :       :     :     :
11:tirsdag:     :     :     :     :     :     :     :       :     :     :
12:onsdag :     :     :     :     :     :     :     :       :     :     :
13:torsdag:     :     :     :     :     :     :     :       :     :     :
14:fredag :     :     :     :     :     :     :     :       :     :     :
15:lordag :     :     :     :     :     :     :     :       :     :     :
16:sondag :     :     :     :     :     :     :     :       :     :     :
17:-------:-----:-----:-----:-----:-----:-----:-----:-------:-----:-----:-----
18:GNS.   :######:#####:ERROR:ERROR:ERROR:ERROR:ERROR:######:#####:#####:#####
19:TOTAL  :######:#####:#####:     0:#####:#####:#####:######:#####:#####:#####
20:------------------------------------Forklaringer nedenunder!---------------
21:         Vindretninger - brug folgende forkortelser :
22:
23:         Nord - N    Nordost - NO
24:         Syd  - S    Nordvest - NV
25:         Ost  - O    Sydost - SO
26:         Vest - V    Sydvest - SV
27:---------------------------------------------------------------------------
28:         Skydaekke - brug folgende angivelser (svarende til ot-
29:         tendedele af himmelen der er daekket af skyer):
30:
31:          1 - 2 - 3 - 4 - 5 - 6 - 7 - 8
32:---------------------------------------------------------------------------
33:         Skytyper - angiv folgende forkortelser:
34:
35:         Fjerskyer (cirrus)        FJ  Makrelskyer (cirrocumulus)   MA
36:         Slorskyer (cirrostratus) SL, Lammeskyer (altocumulus)     LA
37:         Lagskyer (altostratus)    LG, Nedborsskyer (nimbostratus) ND
38:         Flodeskyer (cumulus)      FL, Bolgeskyer (stratocumulus)  BO
39:         Taage (stratus)           TA, Bygeskyer (cumulonimbus)    BY
40:         -----------GAA tilbage ved at trykke paa HOME.----------
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fig. 1

Weather observations in SC3.

through newspapers, radio and TV. Furthermore, it increases the pupils' interest, when they know the place ofobservations and probably the observatories through communication with English pupils.

The possibility of presenting satellite images on the screen, either from floppy discs, official sources or directly from satellite is a sophisticated but didactical straightforward aspect in using computers in the school. This at the same time adds news value and a comprehensive view of instruction. For this purpose the computers can at the same time become essential technical facilities and provide working methods identical to the methods used outside school e. g. in professional meteorology.

A computer operated weather station.

In the frame of the INFA-project a prototype of a computer operated weather station has been developed in a cooperation between the geographical and the physical institute of The Royal Danish School of Educational Studies. The first version of the station will only be produced in few copies which will be placed in some of the schools participating the INFA-project.

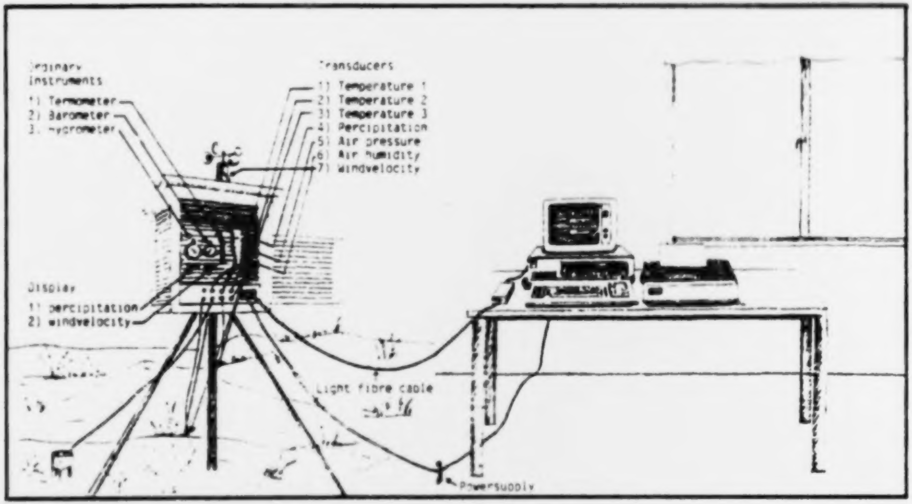

Ordinary
instruments
1) Termometer
2) Barometer
3) Hygrometer
Transducers
1) Temperature 1
2) Temperature 2
3) Temperature 3
4) Percipitation
5) Air pressure
6) Air humidity
7) windvelocity
Display
1) percipitation
2) windvelocity
Light fibre cable
Powersupply

fig. 2

The computer operated weather station.

The software operating the weather station (a prototype was finished November 1987) enable the pupils to set up measurement series where eight weather parameters can be measured: 3 temperatures (in different levels), precipitation, wind direction, wind velocity, air moisture and air pressure. Measurements can be carried out in periods ranging from 1 to 24 hours, and measurements of the chosen channels are automatically carried out each 6th minute. Measurement tables and diagrams can be shown on the screen and data can be saved on the disk.

The goal is to facilitate pupils study of local weather over longer periods of time and to support series of observations comparable among the various schools as well as with the daily weather reports and maps from The Danish Meteorological Institute. The computer operated weather station is further discussed in the article: The use of computers in local environmental studies in lower secondary schools, Keld Juhl Larsen 1987.

Satellite photos.

The use of satellite images especially METEOSAT detections offers pupils the possibility of studying weather phenomena in a larger scale and relate the studies to the observations made in their local environment.

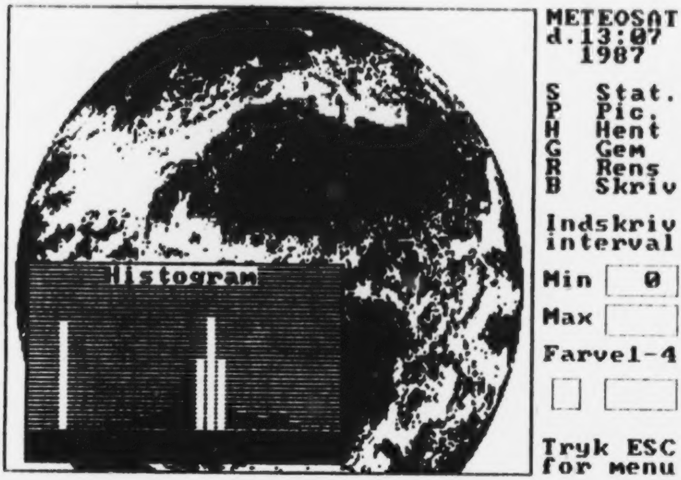
Satellite images stored in a digital form provide a variety of information. E.g. cloud cover and to a certain degree cloud type and areas with different temperatures on sea and land.

Digital satellite images are traditionally processed and presented on professional and expensive digital image processing equipment. On the Geographical Department at the Royal Danish School of Educational Studies development and research has been going on for about a year aiming at a possibility for pupils in the lower secondary school to perform simple digital processing on METEOSAT and NOAH detections by using a standard school computer equipment.

In these efforts a cooperation with the Geographical Department of the University of Copenhagen has been very fruitful. The digital images which are delivered from The Danish Meteorological Institute on tape, has been modified to a format (matrices of 512 x 512 of byte) which enables us to store one image on a 360 kb 5 1/4 inch disk. It then is possible to present and process the images on personal computers with an internal storage capacity of only 256 kb, a standard colour Graphics Adapter and a colourscreen in 320 x 200 mode.

If the computer has 512 kb of internal storage it is possible to create a virtual disk drive large enough to store one image of 512x512 byte. This facility speeds up image processing a lot. Each of the pixels in the image (which has 262.144 pixels) is defined by 8 bit which equals one byte and has a value between 0 and 255. The professional equipment can present each of these values as a colour on the screen and thereby a lot of information.

Most of the computers in Danish schools participating the INFA-project have IBM PC's which are only configured to show four colours on the monitor. This is a great limitation, but still it is possible - by choosing significant pixel-intervals from the image - to present a picture in pseudo colours on the screen, where land masses, the sea and cloud formations can be clearly seen and analyzed.


METEOSAT
d.13:07
1987
S Stat.
P Pic.
H Hent
G Gem
R Rens
B Skriv
Indskriv interval
Max
Farvel-4
Histogram
Tryk ESC for menu

Min 0

fig. 3

The whole earth in infrared shown in four colours on the screen and printed on a standard matrix printer. The picture is drawn by reading each second pixel and each second line in the 512x512 matrix.

The METEOSAT images used are channel 2 AI (referring to the METEOSAT2 dissemination table) detections showing the whole earth in infrared. They use the 11 um window of infrared radiation from the atmosphere, the sea level and the land surface. Low pixelcounts represent low temperatures and high pixelcounts high temperatures.

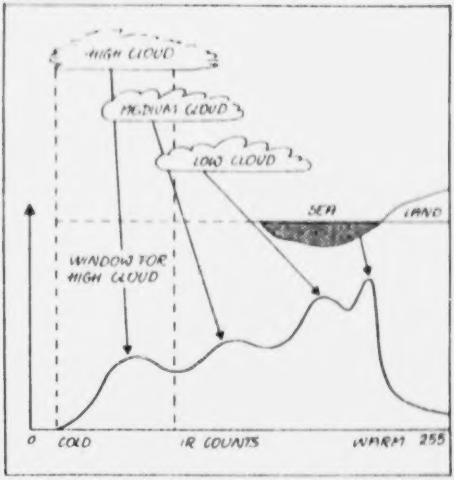

HIGH CLOUD
MEDIUM CLOUD
LOW CLOUD
SEA
LAND
WINDOW FOR
HIGH CLOUD
0
COLD
IR COUNTS
WARM
255

fig. 4

Sketch illustrating the infrared radiance in relation to temperature and pixelcounts.

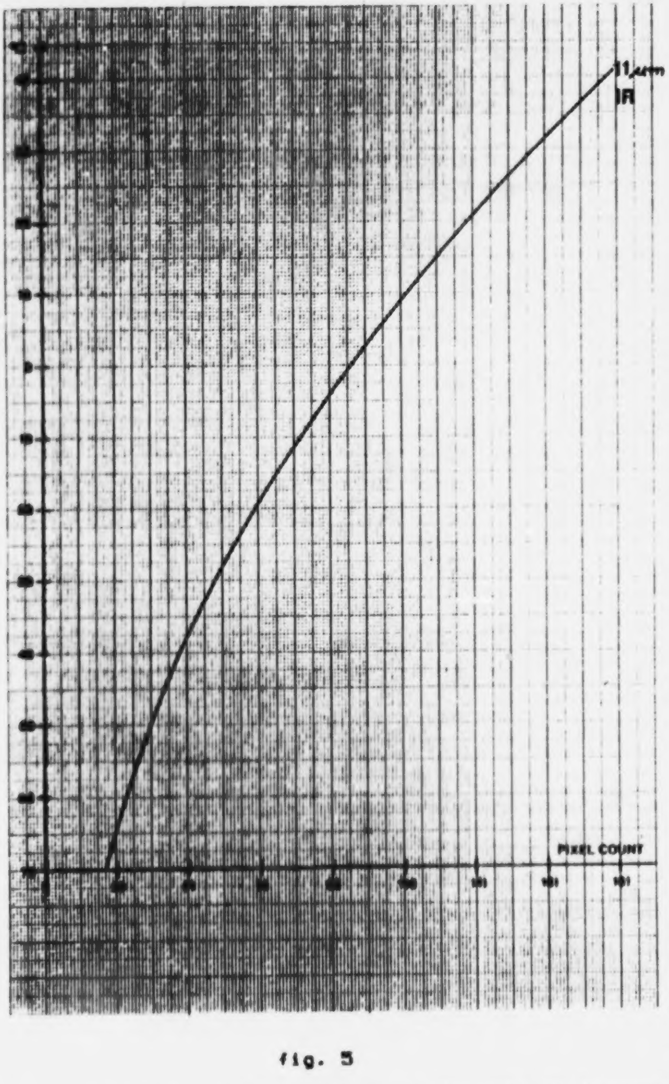
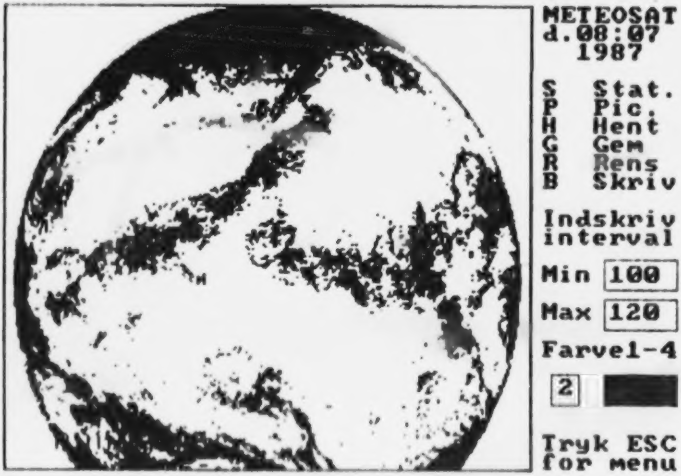


fig. 5

The relationship between pixelcounts an temperature.

The diagram to the left in the screen dump in fig. 5 shows the distribution of pixel-values in the image in fig. 3. The pupils can highlight different pixel-intervals on the screen by using the menu to the left. The screen can be saved and more information can be added on the processed picture by choosing other pixel-intervals.


METEOSAT
d.08:07
1987
S Stat.
P Pic.
H Hent
G Gem
R Rens
B Skriv
Indskriv
interval
Farvel-4
Tryk ESC
for menu

Min 100

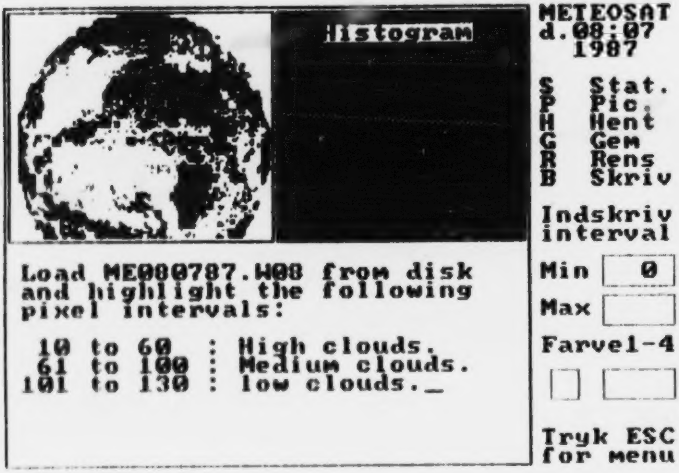
Max 120

Farvel-4 2

fig. 6

Picture where high and medium high clouds are highlighted.

The processed pictures can be saved on disk as a 26 kb picture file which enables us to show series of pictures on the screen. The pictures can easily and quickly be communicated via the IBM/DLH-network. On a special designed screen (fig. 7) descriptions can be made to the current METEOSAT picture. Using the same facility the teacher can develop exercises and write comments to the images.


Histogram
METEOSAT
d.08:07
1987
S Stat.
P Pic.
H Hent
G Gem
R Rens
B Skriv
Indskriv
interval
Farve1-4
Tryk ESC
for menu

Load ME080787.W08 from disk
and highlight the following
pixel intervals:

```
 10 to 60  : High clouds.
 61 to 100 : Medium clouds.
101 to 130 : low clouds._
```

Min 0

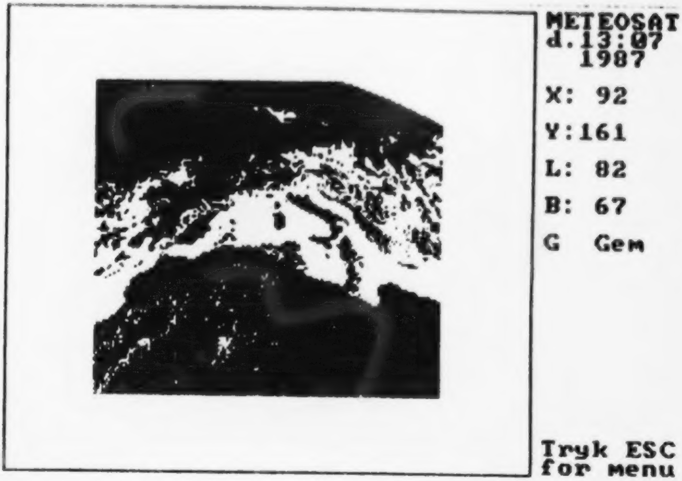
Max

fig. 7

Special screen for writing exercises and comments.

The prototype program facilitates presentation and simple digital image processing based on statistical calculations and presentations - a pixel histogram - made by the computer. The pupil can highlight areas with different temperatures on top of the clouds, the sea level and land surface by choosing different pixel intervals. By using a diagram as shown in fig. 5 the temperature range of the highlighted areas can be decided to a certain degree of precision. For very high and very low pixelcounts the accuracy is rather low.

The prototype program also facilitates presentation of parts of the image in high resolution where each pixel and line are read in the matrix. Two examples can be seen in fig. 8a and 8b.



METEOSAT
d.13:07
1987

X: 92

Y:161

L: 82

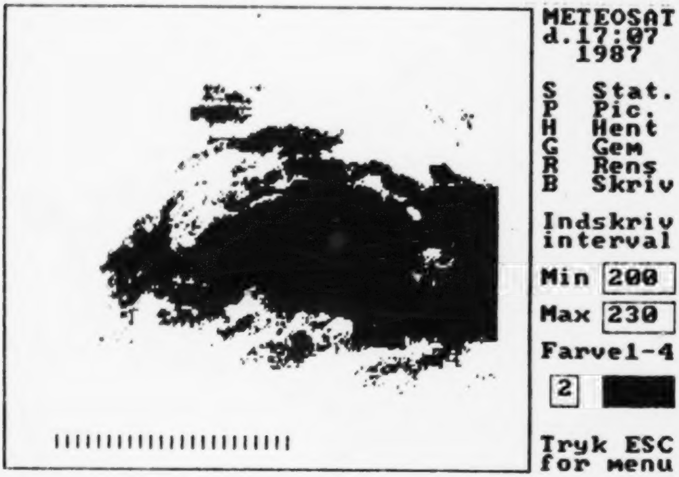
B: 67

G Gem

Tryk ESC
for menu

fig. 8a

Part of METEOSAT image where each pixel in the 512x512 matrix is drawn.



METEOSAT
d.17:07
1987

S Stat.
P Pic.
H Hent
G Gem
R Rens
B Skriv

Indskriv
interval

Min 200

Max 230

Farvel-4

2

Tryk ESC
for menu

fig. 8b

Areas with different temperatures in Sahara.

The educational advantages by using digital satellite images in the teaching of geography can be summerized as follows:

> The use of digital images is a highly interactive activity where the pupils are motivated to:

1. use traditional geographical sources like atlas, weather maps, weather statistics and satellite photos
2. study global and local climate and vegetation.
3. make measurements and weather observations.
4. study living conditions in foreign regions.

The 26 kb satellite picture files can be loaded into a drawing application - e. g. PC-paint - and different map information can be written and drawn on the pictures. Is is also possible to load series of METEOSAT pictures in PC Story Board which facilitates animation and description of typical weather situations.

METEOSAT and NOAH images can be applied to normal classroom practice of study of the local weather in a broader context - in our situation in relation to the northern hemisphere. In a later stage weather radar detections provides additional local information of the distribution and amount of precipitation. Together they provide information of the actual weather situation and can support pupils in making weather forecasts.

Later on LANDSAT images in digital form will be used to provide more detailed information of local areas such as vegetation cover and land use. It demands better equipment in the schools at least an enhanced graphic colour display.

A datalogical network.

Six lower secondary schools participating the INFA project each have a local area networks of eight IBM-PC's.
From autumn 1987 these schools and the previous mentioned institutions have been able to communicate both nationally via the DATEL-network (the Danish Telephone network) and internationally via the EARN-network (European Academic and Research Network). The first pedagogical experiments go for the communication and interchange of information about local weather, milieu and living conditions among schools home and abroad. The above mentioned programmes will facilitate creation of datafiles to be communicated.

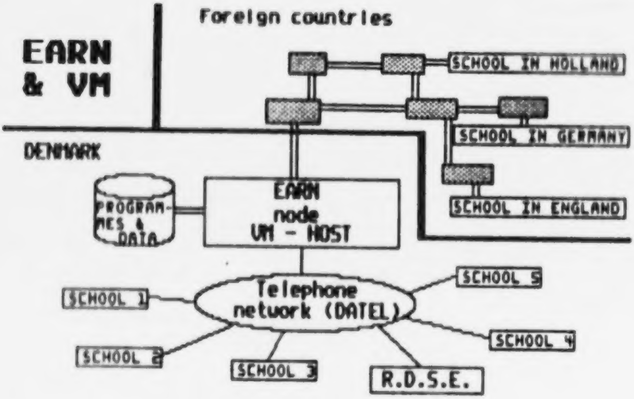

Foreign countries
EARN & VM
DENMARK
SCHOOL IN HOLLAND
SCHOOL IN GERMANY
SCHOOL IN ENGLAND
PROGRAMMES & DATA
EARN node VM - HOST
Telephone network (DATEL)
SCHOOL 1
SCHOOL 2
SCHOOL 3
R.D.S.E.
SCHOOL 4
SCHOOL 5

fig. 9

The logical structure of the communication

This educational development is a try to widen and develop the use, scope and interplay of various geographical media in an attempt to further the applicability of informatics ard educational technology in normal classroom practice. It also aims at representations of and education in important phenomena and topics, which often cause difficulties to practical teaching e. g. coherent regional analyses and description. These efforts aim at better motivation and balance between local studies and studies of foreign regions and global problems.

The Royal Danish School of Educational Studies.
Geographical Institute/INFA.

POLLS AND SURVEYS VIA COMPUTER SOFTWARE

Malcolm H Mathias

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ABSTRACT

A need existed for a versatile computer software package suitable for conducting questionnaires which could be run on microcomputers commonly found in schools. Previous products were unsatisfactory. A newly developed software package titled *Investigator* is introduced here.

Investigator allows the user to design, conduct and then analyse, both graphically and statistically, a complex questionnaire. It is a combination of word processor, database and statistical package.

A wide selection of automatic question formats and editing facilities streamline the process. Students are introduced to the techniques of sampling and surveying. The comprehensive manual includes teaching ideas, worksheets, and many other valuable resources.

INTRODUCTION

The impetus for the major software product discussed in this paper came from the need established by the current Year 12 Geography course in Victoria. Geography students are required to carry out an Independent Research Project as an integral part of their studies. Many of these studies focus on a geographic theme which requires the student to gather information from the local community, frequently by interviewing local residents and small business owners. Most of these interviews utilise a questionnaire and the student invariably faces the time-consuming task of questionnaire design. After completing the necessary interviews the student then faces the onerous task of collating the answers, counting the total number of respondents to each question, calculating the various percentages and perhaps graphing the analysed results. All of this needs to be done before the student can begin the task of assessing and explaining the meaning of the results. This whole process is very time consuming and, in a year where time is precious, it is time that is too precious to waste. The question then to ask is whether computers and computer software can streamline the questionnaire process.

OBJECTIVES

The search of available software was guided by several objectives. The ideal software should:

1. encourage students to conduct surveys in a structured, analytical way, and report on their findings in an objective manner.
2. enable students and teachers to design, print and analyse a survey document on a topic of their own choosing.
3. introduce a variety of question formats to both students and teachers.
4. elicit the required responses from the target population by encouraging the best possible choice of question type.
5. provide an introduction to sampling techniques.
6. operate on the omnipresent Apple][series and IBM JX computers.
7. allow computer novices to feel comfortable with and in control of their research. The software should be 'user friendly'.

PREVIOUS PRODUCTS

A range of products was reviewed and in general they each failed to satisfy all the criteria, although each product met a selection of the stated criteria.

Multiple Choice Quiz by Malcolm Carkeek for Windfall Software
Comment: This is as the name implies, a multiple-choice quiz with testing and learning as a central thrust. It has only limited application as a questionnaire generator.

Survey by Elizabeth Computing Centre, Hobart, Tasmania
Comment: Only available for BBC

Survey Taker (for Apple) by Scholastic
Comment: A useful introduction to the process of survey taking but is limited to multiple-choice questions and the extent of the analysis is simple totals and relative percentages.

Survey - A geographic and statistical program for secondary schools
Under development by Active Learning Systems
Pre-publicity stated "As well as providing the tools for students to develop their own surveys, the program will give a thorough background on the history and practice of surveys".
Comment: This product looked promising but has now been indefinitely shelved.

The TV Survey - A database and study kit for television analysis (for Apple)
by Peter Alderson 1985
Comment: Uses the strengths of Appleworks by supplying specific Appleworks Data Files; ie: it is not a new program in its own right.

The conclusion reached was that there was no product available that met all criteria. The author, sought input from various geography teacher groups and the Geography Curriculum Committee. This response was presented to Prologic, who then gave the go ahead with the development of a new software package titled ***Investigator***. The author was on full-time secondment to Prologic in 1986 when development began, but has since joined the State Computer Education Centre where the project is now nearing completion.

INVESTIGATOR - Design, conduct, and analyse a questionnaire

by Malcolm H Mathias
programmed by Stuart Thomson
published by Prologic Pty Ltd

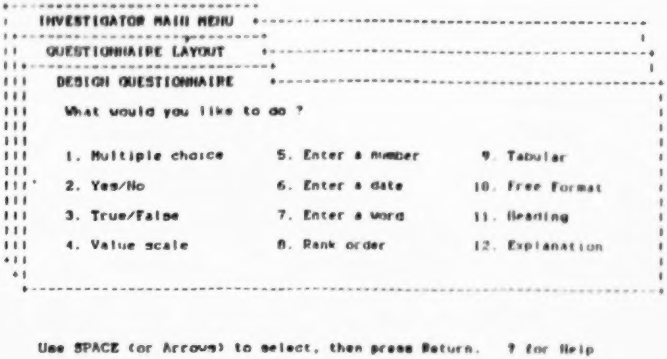
Investigator allows students to design, conduct, and analyse a questionnaire on a topic of their own choosing. The program is a convenient utility which speeds up the process of preparing and processing a questionnaire. As a utility it therefore, by definition, contains no specific subject matter. However, the range of question types available is demonstrated on the *Investigator* data disk with a sample questionnaire on take-away food.

The program operates using simple keystrokes on all menu screens. The user can select any menu item using the **SPACE** bar, the **ARROW** keys or the **NUMERIC** key corresponding to the menu item. The menu selection is activated with the **RETURN** key. The *Investigator Main Menu* allows users to choose one of six options:

1. Read the Introduction
2. Questionnaire layout
3. Questionnaire answers
4. Questionnaire statistics
5. Data disk utilities
6. Finish the program

It is from this main menu that users enter each of the three major functional areas of the program: (a) **Layout**; (b) **Answers**; and (c) **Statistics**.

By choosing appropriate items from the menu users get deeper into the use of the program, but the nested file-tab cards (see Figure 1) allow the user to keep track of where they are in the program. Pressing the ESC key at any stage will take the user back to the previous file-tab card position in the program.



```
   INVESTIGATOR MAIN MENU
    QUESTIONNAIRE LAYOUT
     DESIGN QUESTIONNAIRE

      What would you like to do ?

      1. Multiple choice      5. Enter a number       9. Tabular

      2. Yes/No               6. Enter a date        10. Free Format

      3. True/False           7. Enter a word        11. Heading

      4. Value scale          8. Rank order          12. Explanation


  Use SPACE (or Arrows) to select, then press Return.   ? for Help
```

Figure 1. Nested file-tab cards

QUESTIONNAIRE LAYOUT

Users are free to design their own questionnaire using a heading, explanatory text and any mix of question types chosen from the following:

1. **multiple choice:** respondents choose from between 2 and 14 alternative answers.
2. **yes/no:** respondents answer using yes/no, yes/no/undecided, or yes/no/ undecided/conditional jump responses.
3. **true/false:** respondents answer using true/false, true/false/undecided, or true/false/ undecided/ conditional jump responses.
4. **value scale:** respondents answer by placing a cross on a scale with two, three, or five labels.
5. **enter a number:** respondents enter a number between -20,000,000 and +20,000,000 and may enter floating point answers up to two decimal places.
6. **enter a date:** respondents enter a date as dd/mm/yyyy. eg: date of birth.
7. **enter a word:** respondents enter any word up to 26 characters in length.
8. **rank order:** respondents rank between 2 and 14 alternative answers in their preferred order.
9. **tabular:** respondents answer by placing one or more ticks in a rectangular grid of answer boxes which can be anything from 2x2 to 5x5 boxes in size.
10. **free format:** respondents write an answer in a blank space. These answers cannot be stored in the *Investigator* program as they use too much disk space.
11. **heading:** the user can give the questionnaire a title, an author/organiser's name, a school/ business identity, and a date or other information. This information is then printed in a questionnaire heading section at the beginning of

the questionnaire. The program automatically takes the author/organiser's name and uses the same information in an end of questionnaire "thank you" section.

12. explanation: the user can give an explanation in the body of the questionnaire which provides the respondents with necessary information. The user may wish particular respondents to only answer a selected group of questions, and the explanation is then used to give appropriate directions. The explanation can also be used to provide data or a quotation as the basis for later questions.

The program offers the user a pre-formatted blank of whatever question type is selected, and the user simply fills in the text of the question and any alternative answers. The program automatically numbers each question in sequence, and provides all necessary instructions to the respondent (eg: Tick the box below) and all the graphics including boxes for the respondent to tick.

The finished questionnaire may then be printed and photocopied for distribution to the people the user wishes to survey.

QUESTIONNAIRE ANSWERS

The answers are then entered into the computer by choosing the *Questionnaire answers* option on the *Investigator Main Menu*. To enter a new answer the user selects the *Enter new answers* option from the *Questionnaire answers* menu. The user enters the answers by answering the questions as they appear on screen. The program highlights the cursor in the first available answer position for each question. The user either enters the answer directly into that answer position, or uses the SPACE or ARROW keys to select a new answer position, and then presses RETURN to activate the answer given.

Different sets of answers are identified by a respondent number. The program automatically enters a blank answer space to receive the respondent number information at the start of every questionnaire. It appears between the user-entered *Heading* details and the first user-entered question. The number of individual sets of respondents' answers which can be entered is limited by the type of questions asked and the capacity of the disk in the system being operated.

DATA DISK CAPACITY

The number of questions and answers which *Investigator* can save and store on disk is limited by the size of the disk drive used with the system. It has been assumed that most users will have five and one quarter inch floppy disk drives attached to their system.

The need for storage space increases with any increase in the number of questions in a particular questionnaire. Similarly, some question types require more storage space than others, and 'five by five' tabular questions are particularly demanding in the amount of space they need. Finally of course more storage space is needed with increasing numbers of respondents. The following figures give an approximate guide to the data disk capacities.

Note: These figures can be considered estimates only. *Investigator* is not yet finished and final capacities will not be known until the final product is produced.

Typical question type	Number of questions	Number of answers
All 5x5 Tabular	29	40
Mixture of all types	29	200
Simple Yes/No	29	850

When all answers have been entered the user selects *Questionnaire statistics* from the *Investigator Main Menu* and the program will then analyse the answers and calculate appropriate statistics for each question type.

QUESTIONNAIRE STATISTICS

The *Investigator* program will calculate appropriate statistics for the different question types. The following information contains a summary of the statistics given for each question type:

1. **Numeric answers (including dates):** (a) Total number of respondents; (b) The average of all answers; (c) The maximum answer given; and (d) The minimum answer given.
2. **Multiple Choice:** (a) Total number of respondents; (b) Number of respondents who gave each answer; and (c) Percentage of respondents who gave each answer.
3. **Yes/No:** (a) Total number of respondents; (b) Number of respondents who gave each answer; and (c) Percentage of respondents who gave each answer.
4. **True/False:** (a) Total number of respondents; (b) Number of respondents who gave each answer; and (c) Percentage of respondents who gave each answer.
5. **Value Scale:** (a) Total number of respondents; (b) Number of respondents who gave each answer; and (c) The average of all answers (On a scale of 1-5, 1-7, or 1-9 from left to right).
6. **Enter a Word:** The program attaches a list at end of questionnaire. The list sorts the responses and shows the frequency of occurrence of all words used one or more times.
7. **Rank Order:** (a) Total number of respondents; (b) The average rank given for each answer which is written in the answer box eg: 13.99; and (c) The number of times respondents ranked each answer as 1 (written before answer box).
8. **Tabular:** (a) Total number of respondents; (b) Number of respondents who gave each answer (23); and (c) Percentage of respondents who gave each answer (85.0%) eg: Number:Percentage (23 : 85.0%).
9. **Free Format:** No statistics calculated by the program.

Prologic have plans for a second product in the *Investigator* series which will take tha data established in this product and allow a full database style interrogation of the data. Another planned product will access the same database and allow a wide range of statistical tests to be applied to the data. It is probable that the future development of these latter products will be heavily dependent on the degree of success achieved by *Investigator.*

TEACHING IDEAS

The manual for *Investigator* includes comprehensive notes, worksheets, data sheets, a glossary and a list of appropriate references. These provide both teachers and students with a variety of resources which are designed to enhance the use of the software. Many of these resources are designed to be used by the students before they begin using the computer. They provide excellent material for students to be working on while they wait their turn at the computer.

There are many aspects involved in the successful design, implementation and analysis of a questionnaire. An introduction to these aspects prior to running the computer program would be beneficial for students. Students should be given some training in each of the following areas:

1. correct phrasing of questions
2. choosing appropriate answer types
3. designing the questionnaire size and layout
4. deciding on sample size and sampling method
5. presenting the survey to potential respondents
6. analysing the respondents' answers
7. writing a report

The worksheets and data sheets contained in the manual for *Investigator* will assist teachers by providing black-line masters of a wide variety of materials designed to stimulate and assist students in producing and completing a successful questionnaire survey.

Data sheets
The data sheets contain a wide variety of newspaper cuttings which reported the results of various polls and surveys conducted by professional pollsters and market research organisations. The topics reported are quite varied and testing in schools revealed a high degree of interest among students. Examples include:

1. "Census reinforces notion of worthless housewife" from *The Age* of July 5, 1986.
2. "Doctors top respected jobs list" from *The Sun* of August 22, 1986.
3. "ID cards: two out of three say yes" from *The Age* of July 7, 1986.
4. "Jobless should earn the dole, says poll" from *The Age* of July 8, 1986.
5. "Many pupils try pot: school study" from *The Age* of June 18, 1986.
6. The Australian *Census*, June 30, 1986.
7. "Violent crimes topple jobless as major worry" from *The Sun* of April 8, 1986.

Worksheets
The worksheets contain a sample of each of the question types available in the *Investigator* program. These samples are produced in the manual as a complete example question and as a pro-forma blank on which the students can practice before taking their turn on the computer.

The black-line masters are easily photo-copied (no copyright problems) and contain one of each of the following: (1) Heading; (2) Explanation; (3) Finish/Thank you; (4) Enter a Word; (5) Enter a Date; (6) Enter a Number; (7) Multiple Choice; (8) Rank Order; (9) Yes/No; (10) True/False; (11) Value Scale; (12) Tabular; and (13) Free Format.

TRIALLING

The teaching resources contained in the Investigator manual have successfully encouraged students at the Methodist Ladies College and Glen Waverley High School to conduct surveys in a structured, analytical way, and they reported on their findings in an objective manner. These students were able to design, print and analyse a survey document on topics of their own choosing by using *Investigator* on IBM JX machines. The *Investigator* package introduced a variety of question formats to both students and teachers. They were able to elicit the required responses from the target population by using appropriate question types. They felt that the introduction to sampling techniques had allowed them to better appreciate the significance of their results. The Year 11 Geography classes were computer novices and many said that they felt comfortable and in control of their research.

CONCLUSION

The history of development of *Investigator* has allowed the software to be tailored precisely to meet the perceived needs of Year 12 geography students. The program satisfies all of the previously stated objectives and trialling has demonstrated its ease of use.

Investigator will hopefully make a significant contribution to the process of designing, conducting and analysing a questionnaire. The tedium of previously manual tasks will be greatly streamlined through the use of this computer software package. The package should be a catalyst for renewed interest in conducting community studies.

The *Investigator* package is not just another software package. It is a complete kit of resources which allows users to learn something about the skills involved in planning and conducting a questionnaire while obtaining specific information on a topic of their choice. It is a very versatile utility and will probably be used extensively by schools for a variety of survey purposes.

Anyone interested in obtaining a copy of *Investigator* should contact Softime Australia Pty Ltd (the software division of Prologic Pty Ltd), 19 Cato Street, Hawtorn East, Victoria, 3123 Tel: (03) 209 0222

LIFE AS AN ADVENTURE

using the computer to simulate life situations in geographical education

Henk Trimp

ABSTRACT

Literature can contribute to geography teaching aimed at developing spatial orientation, understanding of the environment and empathy for other people's experiences. Interactive literature (computer adventures) can compensate some of the shortcomings of books by integrating personal experience ('private geography') with data handling on different levels of analysis ('academic geography'). The development of a tool for generating geographical situations is described and the use of this tool in geography teaching is discussed.

INTRODUCTION

> 'I set off round The Lizard, the most southerly headland in England and subject to the same sort of erosion as Land's End. The path was like a three-lane motorway round here and being Sunday the traffic was heavy. (...) On the clifftop the day trippers gazed out to sea through binoculars or sat in their cars reading the newspapers and having picnics. (...) Cadgwith, like all the really pretty places, appeared suddenly, one step around the headland. It was a fishing village with all the standard features: thatched cottages, a village pub, a tea shop, links with the smuggling era, coloured boats drawn up on the beach, and narrow streets trimmed with double yellow lines.'(Wallington, 1986, 128)

Walking the coastal footpath of Cornwall, accompanied by his dog Boogie, Mark Wallington makes sharp observations about the landscape he traverses, the remnants of the past he finds on his way and the contrasting ways of life of the Cornish people and the (summer) visitors.

Wallington's travel story contains a lot of both human and physical geography. Resting on the top of a cliff watching the tide coming in he wonders about the intricacies of the movements of sun and moon. Bumping into the old engine houses of the tin- and copper-mines he recalls the history of the Cornwall mining industry; the influence of railway construction in the nineteenth century; the collapse due to the discovery of new fields in Chile and Australia and the revival in the Sixties. He also describes the way the remnants are now used either by gulls or in tourism by way of a pub or a restaurant. Reading such an account one recognises the eye of the geographer: '...someone who percieves, explores, experiences and acts in space...' (Donaldson, 1975).

The value of literature in geography teaching has been recognised by humanistic geographers for many years. In literature the student is confronted with the lifeworld of private geographies and this can help students to relate succesfully to their own environment and increase a level of empathy for other people's experience (Fien, 1983).

Still, literature is not widely used in geography teaching. Two reasons for this may be important:

First, it is hard to find literature written in a way that captures the interest of children and second, literature may stress private geographies, but educational goals concerning academic geography seem often not to be catered for.

The starting point for the project described in this paper is the thought that a solution for these problems may be found in a special form of computer assisted learning: interactive literature, used as an interface to a database.

INTERACTIVE LITERATURE

In interactive literature, most widely known under the name computer adventure, the students/players enter into the role of characters in a story. The players have access to information about places, regions, characters and objects they encounter. The story presents several problems and questions. The decisions of the player affect the subsequent unfolding of the plot. You just can't read unobservantly and finally close the 'book' without having learned anything. Also the story will be new everytime you reenter it; there are a lot of different paths to pursue.

Preliminary research on using adventure games in primary education has shown considerable involvement of pupils leading to the use and development of a wide range of skills in reading, thinking, communication and cooperation (Hart, 1987). One experiment in geography teaching concerned the learning effects of reading The Hobbit (Tolkien, 1975) compared with those of using the interactive version (Melbourne House, 1986). The results indicate that knowledge about the topography of the environment (relative location, wayfinding) increased more by using the interactive version. In contrast, the students who read the book gave more vivid descriptions of landscapes and characters (Vogelaars, 1988). Interpretation of these results were considered in following projects but discussing them lies beyond the scope of this paper.

DATA HANDLING

Learning has to do with experience. Perception and analysis of events are supposed to lead to understanding. Every action is based on this understanding of reality. In educational theory a shift has taken place from a one-way transfer of knowledge to the creation of an environment in which the student is stimulated to pursue his own process of inquiry. In studying reality we can discern phenomena possessing attributes. Statements about these attributes form data. Selection, ordering and interpretation of data are important skills, needed to acquire an understanding of reality.

In interactive literature the relation between perception, learning and action is well stressed. The data contained in most existing adventures however are primarily about unique characters, objects and places while geographical skills also include analysis of data on a more aggregated level.

In addition to this, the characters involved are often dragons, wizards, princesses or gnomes. This makes the story exciting but it only contributes to an understanding of the real world on a certain abstract level . Last but not least, the fact that most adventures are based on a topological network, which means that the areas of locations and the distances between locations are irrelevant, poses severe limitations to an application in geography teaching. This all inspired the wish to build a tool for creating stories including more generalised information and some basic geographical principles. To this effect interactive literature was interpreted as a tactical interface to a multi-level database.

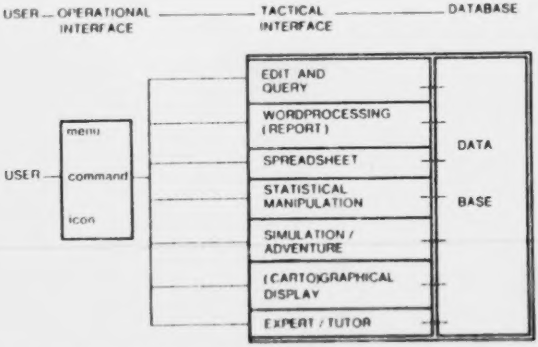

USER — OPERATIONAL INTERFACE
TACTICAL INTERFACE
DATABASE
USER
menu
command
icon
EDIT AND QUERY
WORDPROCESSING (REPORT)
SPREADSHEET
STATISTICAL MANIPULATION
SIMULATION / ADVENTURE
(CARTO)GRAPHICAL DISPLAY
EXPERT / TUTOR
DATA
BASE

Figure 1. Structure of an integrated system of Computer Assisted Learning

The simulation of a real world situation through simulations or adventures is one of the ways in wich the students can interact with data (Trimp, 1988a). Combination with other tactical interfaces like those presented in figure 1 provides extra opportunities to integrate private and academic geography. The production of a simulation interface was undertaken in a project called 'The Geographical Situation Generator' (GSG).

THE GEOGRAPHICAL SITUATION GENERATOR

The specification of the GSG (de Graaf en Trimp, 1988) was preceded by examination of existing adventures and adventure generators. By far the most helpful was the Quest Adventure Generator for the BBC B machine (Hart and Hinder, 1985). This generator, being database oriented, allows users to create data files of persons (actors), objects (props) and locations (scenes) using the quest information handling package (AUCBE, 1984). The topological layout of locations and the relations between characters can be defined by the users who can also specify events that happen during the course of the adventure (Hart, 1987, 276).

A similar structure forms a locational level in the GSG. This is the level on wich the player moves, meets people and finds things. Topography is introduced by including direction (compass orientation) and distance. Also, the type of connections between locations can be defined (motorway, footpath, river, railroad etc.) influencing speed of movement depending on choice of vehicle.

On top of this, up to three regional levels can be defined (see Figure 2). So the designer of an interactive story can store data on four spatial levels (one locational and three regional) and on actors and objects.

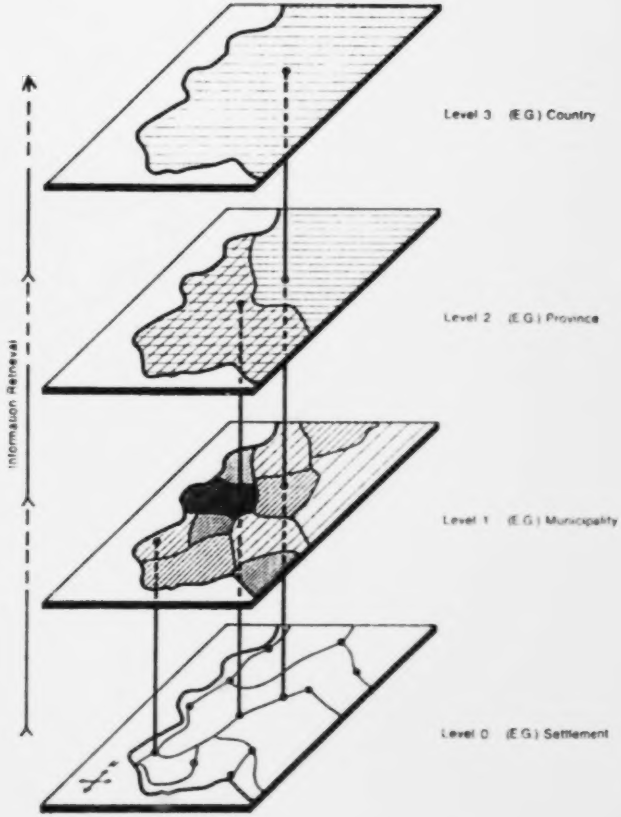

Level 3 (E G) Country
Level 2 (E G) Province
Level 1 (E G) Municipality
Level 0 (E G) Settlement
Information Retrieval

Figure 2. Levels within the Geographical Situation Generator

The player can always retrieve the information on the location he is at and on the higher levels by using simple commands. In addition he can question people he meets (e.g. a bartender, the mayor) and examine things he finds (e.g. a rock, a map). Some information may be secret, only to be obtained when the player meets certain requirements.

The designers of a situation decide which information will be available at what time, at which place and under what circumstances and thereby create their own micro-world. Situations can be defined by teachers but also by pupils themselves. Depending on the complexity of a situation the time needed will vary from one hour to several months (project work!).

Several example situations were developed to give an idea of the potential of the generator. These examples vary in scale and also in theme. By definition the generated situations are regionally based. The space in which the story unfolds can range from a local community (or even just a building) to the entire world (or even the galaxy and further, if you wish). By carefully choosing the data to be stored and by defining conditions and events one can focus on a certain theme, for instance ecology or economic dependence. However this thematic approach can never be detached from the level where people live. This starting-point of combining the 'lived world of everyday life' with the interrogation of information on aggregated levels will hopefully result in a tool with which children can acquire geographical skills that are above all life skills (Trimp, 1988b). One example will be considered more closely.

THE CORNWALL ADVENTURE

Like all situations created with the GSG, the Cornwall Aadventure (Trimp, 1988c) is based on a map (figure 3). Locations, connections and distances are derived from this 'basemap'. At every location people and objects can be situated. Figure 4 shows a detail of the Cornwall situation.

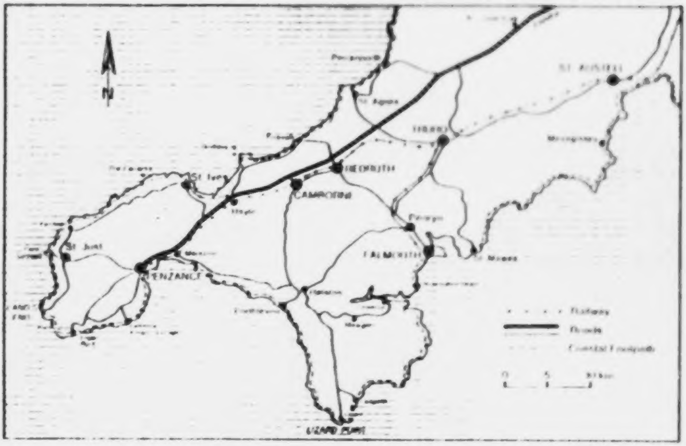

N
St Austell
Perranporth
St Agnes
Truro
Redruth
Camborne
St Ives
Penryn
Falmouth
St Just
Penzance
Mevagissey
St Mawes
Helston
Lizard Point
Railway
Roads
Coastal Footpath
0 5 10 km

Figure 3. Part of the basemap of the Cornwall adventure.

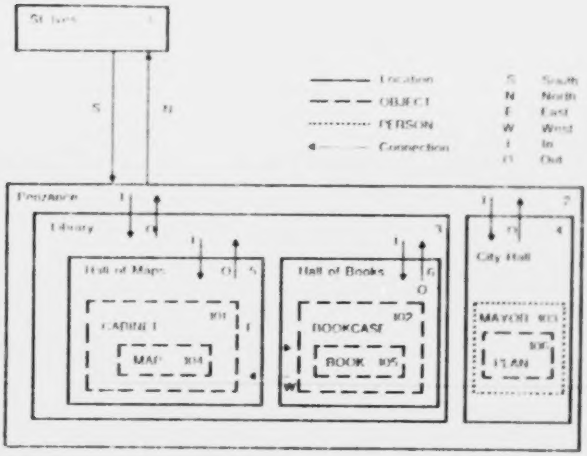

St Ives 1
S
N
Location
OBJECT
PERSON
Connection
S South
N North
E East
W West
I In
O Out
Penzance I O 2
Library I O 3
Hall of Maps I O 5
Hall of Books I O 6
City Hall I O 4
CABINET 101
MAP 104
E
W
BOOKCASE 102
BOOK 105
MAYOR 103
PLAN 106

Figure 4. Detail of the Cornwall Adventure

An object is movable or fixed, depending on its measure. Large objects with an opening, for instance buildings, can be entered and can be considered a location within a location. The Library and the City Hall in figure 4 can be entered. In the library the player can for instance enter the the Hall of Maps in which he can find a cabinet containing a map. The map can be taken out of the cabinet and subsequently examined.

In this situation topics as mentioned in the introduction are encountered. The development of Cornwall and the changes in the lifestyle of the inhabitants are considered, linking and comparing Cornwall with other parts of the United Kingdom and regions in other countries. In order to be successful the player will have to read and interpret several maps, both topographical (spatial orientation, wayfinding) and thematic (discovering spatial associations). These maps are provided in the additional material, not in the (text oriented) program.

For future versions of GSG cartographical options are planned as well as video-disk integration. At the moment a combination of the GSG and separate cartographical programs in a classroom situation is encouraged by distributing cartographic boundary files and data files along with the example situations.

DISCUSSION

1. The use of interactive literature in geography teaching is a new approach to the integration of 'private' and 'academic' geography. The Geographical Situation Generator provides a tool to create and enter environments in which a student 'learns by experience'.

2. Computer simulations cannot replace the real world and software developers should not reach for the impossible by trying to change this. On the other hand people do not tend to travel the whole world and also in some cases a simulation is a lot safer. Surrogate worlds can fill a gap here.

3. Creating a situation with students, based on personal experience (for example in field study trips), comes close to optimal geography teaching in combining exploration, analysis and creative work.

4. Geographical situations form an open learning environment and are therefore especially suited for mixed ability groups. Children can choose their own learning routes and strategies.

5. Geographical situations have a positive motivational effect by stimulating children to assume an open and active attitude (to life in general and to geography teaching specifically).

6. All these former claims are highly speculative and will have to be verified by research.

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PAPER AND ABSTRACT IGU CONFERENCE BRISBANE 1988

GISET

An On-line Information System For Geography Teaching.

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Abstract

This paper describes the educational context for the design and set up of an online Geographical Information System as an Educational Tool (GISET) in the Netherlands.

This GISET project aims at:

1. providing geographical education with an adequate online information technology system;
2. selecting a relevant set of online information handling skills as part of tomorrow's geographical education;
3. building a formal online network for related projects.

The paper indicates the relation between our ideas of tomorrow's education and the choice for a particular information system. The structure of GISET is sketched out as well as some of the technical facilities. GISET is described as an integral part of the national inservice training for CAL in Geography and relations with other (online) projects are given.

Suggestions are made to do research on possibilities for an international network of online information systems for geographical education.

1. Introduction

With the provision free of cost of 11 MS-DOS machines in all schools for secondary education in the Netherlands between 1985 and 1988 a standard equipment has been installed to stimulate a broader dissemination of applied information technologies. Simultaneously geography managed to become one of the subject areas in which information technology has prospered (1). On the national scale the Department of Geography for Education (State University, Utrecht) emerged as the heart of activities in developments as well as in management tasks. Given that position the State University approved a research project on the design and development of a Geographical Information System as an Educational Tool (GISET) to be used in secondary education. Started in January 1987 the project will research the possibilities of an interactive network for pupils, students and teachers to retrieve, download and handle geographical information in a true information technology environment within a curricular context. The project was launched with the long term aim of integrating and extending the existing know-how of the Utrecht Geographical Institute with large international Geographical Information Systems for spatial planning and analysis. This paper deals with the educational views behind and issues raised by the project more than to give a detailed description of the system itself.

2. Designing GISET In A Changing Educational Environment

In the early days of CAL in Geography some authors warned of over-enthusiasm in developing applications for yesterday's classrooms. Others pointed out that online information retrieval was likely to become a common facility for pupils and students in the near future (Stoltman, 1984). Over the last five years most developments on educational technology can be placed somewhere in between. On the one hand projects join in with current curricula and classroom practice (dedicated software like games or simulations), on the other hand they aim at breaking the educational approach to a more open learning environment (database systems, satellite imagary, interactive video). The GISET Research Project links up with the latter. It aims at designing, developing and running a prototype version of an online Geographical Information System to integrate with tomorrow's geographical education. At the same time the technical infrastructure in education is changing as is the profile of the new generation of teachers. Geography syllabuses are dynamic and information technology will (and in some countries actually does) play an important role in that process. From a design point of view this forces an experimental system approach with a high degree of user involvement from the beginning and a highly flexible system. It seems that online information systems have not yet been designed for geography teaching (2), neither is there any notion as to what influence this kind of learning material will have on the information needs, classroom activities and curriculum development in secondary education in the coming years (3). Neither teachers nor their pupils or students as potential users are to blame for their inadequacy to specify information requirements for a system they have never worked with. Finally, we noticed that system designers can not rely upon well tested information analyses techniques for educational information systems at all. It became clear to us that, after five years of experience in the development of CAL material for geography, designing GISET would be a pioneering task.

The problem is clear. But building an information system for 'tomorrow's education' also puts the question what education will be like even in the nearer future. Should we concentrate on 'classroom teaching' or should we explore more fundamentally the power of online applications for 'home' and 'distance' education as well? For, much geographical education takes place outside the classroom or even outside schools. And to what degree will financial consequences for the user influence the possibilities of succesful exploitation? What technical infrastructure will be the educational standard for the next 10 to 15 years? And to what extent will geographers be inclined to accept changes in the curriculum?

To cope with such variables and uncertainties we decided to set up an online system based upon issues and assumptions with regards to technical and educational aspects. This system should create an experimental environment for the project team as well as for the users. It should also give insight into the user's behaviour in online information retrieval for educational purposes. After a period of designing and building the system (Januari 1987 to May 1988) we are now in an operational stage, open to the broader educational public. At this point we are even ready to link in with international projects.

3. Aims, Issues And Assumptions

Geographical Information Systems (GIS) can be seen as any information system designed to store, retrieve and handle geographical information. But although schools for secondary education are increasingly equiped with the computer facilities to contact Geographical Information Systems, such systems did never really conformed to information needs of secondary schools.

However, in the GISET Project, online application by schools was essential from the start. The research goals were to work out the geographical information analysis and educational system analysis for geography teaching and to work the specifications for a geographical information system as an Educational Tool (GISET).

For the specification stage we formulated the following issues:

1. A Geographical Information System as an Educational Tool should at least meet the requirements of standard computer facilities in schools.
2. To assure a broad access to GISET a 'Computer Independent Application' should be installed.
3. Access costs and the 'online'-connection should be fully under control without heavy financial consequences for the individual or the institution involved.
4. Full control over the (geographical) content of the information system should be guaranteed.
5. The system under development should allow the project to evolve to a broader facility network.
6. The GISET Project should include possibilities of linking in with other projects and further developments.

We assumed that the necessity of extra financial efforts to access and use would hamper geography departments, schools and individuals to log in. As a consequence we tried to avoid the development of a complicated software package for whatever type of microcomputer. Even so the purchase of expensive devices or hardware facilities should not be neccessary for the use of GISET. The information stored should be designed to support an educational environment and should be collected and edited with this aim in mind. That is to say that type, content, format and intellectual level of data and information in store should be tuned at the target group (12 to 16 years) and the aimed use in educational settings. In the longer run the Project should facilitate integration with other (inter)national networks, interactive video and academic Geographical Information Systems (GIS), such as located within several Geography Departments at Universities.

4. From issues to an operational system

Apart from the recently installed set of 11 MS DOS machines a broad variety of brands, makes and types of microcomputers can be found as previously installed computer equipment. For the social sciences it is likely to suggest that the accessibility to this hardware will increase, even to the point of permanent location in, for example, the geography classroom. To create a system to be used by as many classes and teachers as possible the idea was to involve this equipment as well. At the same time we felt that good educational information handling packages for MS-DOS machines and in the Dutch language will not be available until 1989. As a consequence in the design stage of GISET we concentrated on a computer independent application that should avoid problems of portability. The process of specifying information needs and system analysis suggested the setting up of an online viewdata system as a tool for further design and specification, in combination with the use of the public telephone network.
At this point we benefited well from a recent geography project on viewdata systems. For the Dutch public viedata system (VIDITEL) the Department of Geography for Education developed a geographical search tree, just to access more quikcly and directly the geographical information available on this databank. Experiences from teachers in using this geographical tool made clear that the system of individually addressed passwords with large possible financial consequences is hardly transportable to the organisational structure of secondary education. The use of such a system should not be a charge on the individual or the teacher nor aff[illegible] his relationship with the school board. The alternative was to start an 'open' private information system with a cost structure under control and a system of passwords without financial consequences. This has led to install a videotex host facility at the Institute (4) which allows the setting up of a prototype, to start a network and to experiment in smaller groups.

5. GISET: a description

Having studied the variety of projects in different countries using videotex systems for educational purposes we have not yet recognised our ideas in any applied system. In the distinction between business oriented public viewdata systems and private non-business applications GISET fits into the latter. GISET aims to providing teaching or classroom material to be used by pupils and teachers for educational purposes. So GISET contains mainly subject oriented digital graphs, texts and worksheets which can be used and printed out, but also datafiles to be downloaded and stored and manipulated locally. Smaller tutorials are available as will be exercises and drills. The material will partly be curriculum based, partly will it function in a broader context of geographical information. Besides it provides groups of teachers, pupils or schools their own communication system with open or closed bulletin boards, postbox facilities and news. There is open access to anyone without any subscription (even from abroad), but more information will be available when you ask for a private (costless) password. Groups of users are registered according to their educational status and blocks of information are opened as an extra facility for special user groups. For instance, there is information available about the Foreign trade of Western-Germany from 1950 to 1985 (part of the GCSE equivalent syllabus for geography). Some worksheets to analyse and compare these data are just accessible for teachers, others are open to anyone. Also, doing some experiments with smaller groups of schools we temporarily upgrade the user status of the participating teachers so that only they can access, react or comment on the relevant information. Extra attention is given to educational support for teachers in organizing their classroom situations for online work. Setting up relevant groupwork, suggestions on how to work offline with or without computers with the material available and so on.

6. The GISET Structure: Information, Facilities And Research

GISET consists of a collection of clearly defined information modules in a broad variety of aspects. At this moment navigation through the system is mainly menu driven although keyword search is possible. Figure 1 shows the three main blocks at the head menu, each of which will be described shortly.

a. Welcome in GISET
This part (with a summary in English available) introduces the user to GISET. It offers guidelines, information about GISET as a project, possibilities of private passwords and other introductory information. It also gives explanations to facilities, telephone numbers for the help-desk and so on (see fig. 2).

b. Information in GISET
This will become the body of the system and can be seen as divided into three blocks (see fig. 3). Option 1 contains information modules about regions, geographical phenomena and processes. Option 2 gives 'lesson modules', i.e. interactive tutorials to learn about concepts, to do exercises and offers possibilities to download worksheets.
Option 3 is dedicated to special Projects and the last option (here: 8) gives a list of descriptions of geographical concepts which is interrelated with option 1 and 2 and can be consulted in interaction with the other modules.

c. Extra Tools
This part opens a window to a set of technical and informational facilities for the user. Overviews are given of geographical datafiles that can be downloaded to be used in educational databases, and a list of the national geographical educational software. Electronic mailing facilities are offered via public bulletin boards, private postboxes, bulletin boards for closed user groups and the like. There also is the agenda for special events, the announcement of workshops and recently published articles on CAL in Geography.

Figure 1. GISET structure for the three main blocks in GISET.

Figure 2. Structure of block 1 (see fig. 1) in further detail in the Dutch language. Each separate element contains smaller or larger modules of 3 up to 30 screenpages.

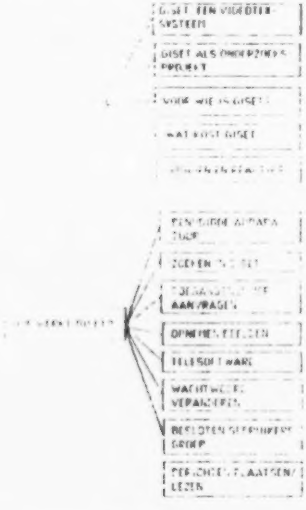
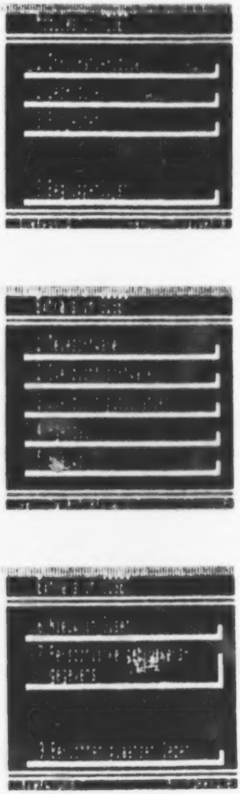

GISET, EEN VIDEOTEX-SYSTEEM
GISET ALS ONDERZOEKS-PROJECT
VOOR WIE IS GISET?
WAT KOST GISET
ZOEKEN IN GISET
AANVRAGEN
OPNEMEN
TELESOFTWARE
WACHTWOORD VERANDEREN
BESLOTEN GEBRUIKERSGROEP
BERICHTEN PLAATSEN/LEZEN

Figure 3. The GISET main structure in blocks



Two other management and research facilities should be mentioned here. First there is the possibility of digital inquiries. Each person, using her or his personal password, can be addressed personally to type in answers on pre-coded questionnaires. This allows us to collect frequently data on a number of aspects concerning the system, the information and so on, with a high percentage of response.
A second facility is that we as system managers can research the functionality of available information. The system records automatically how often a particular (set of) screen page(s) has been retrieved and how often it was downloaded or printed out. This gives an extremely detailed information about the use or lack of use of designed modules. Additional questionnaires (digital or not) can collect data to translate that information into user-group analysis and system development.

7. Interim report on user experiences

At the time of writing (February 1988), experience is relatively limited. It was planned to have an experimental stage to test the technical aspects of the system, to define procedures and protocols for the system management, and to work on the design of a variety of educational applications. Therefor the system was put in action online 24 hours a day from June 1987. In February 1988 we had a resonant group of about 100 regular users. 30 % of them are Geography Teacher Trainers, running courses on CAL in Geography in their syllabuses. Since we first wrote about GISET [illegible] [illegible]onal News Bulletin in December 1987 the use of the system is [illegible] daily, as is the number of private passwords. This first genera[illegible] users corresponds with us via the bulletin boards. Technical [illegible], suggestions for information and classroom reactions have been registered in the last months. Also messages were found from teachers about additional software they suggested to use in combination with GISET. So we may state that early users of the system show a variety of applications which promises a stimulating job for the research team. It is clear that in the coming months a first inventory can be made about 'real time' use of the system in educational settings (5).

8. GISET In Relation To Other Projects

As mentioned earlier one of the aims of the project is that the concepts of GISET can develop into the central node in the network facility for Geography Teaching and Information Technology, at least in the Netherlands. Two related projects should be described here to indicate what we have in mind.

a. The NIVO Project

In the years 1985-1988 the NIVO Project will have supplied all schools for secondary education with a MS-DOS computer room, a Starting Package with MS-DOS software and a nationwide inservice training programme. In this Inservice Training programme courses are developed for subject specific application of Information Technology. For Geography the author's Department of Geography for Education coordinates these courses and GISET is integrated in this project as the online application. For these courses we designed a strategy to introduce online information retrieval in secondary education. Applied on several themes a logical set of 10 information handling skills are integrated in 4 modules for four different age groups. The skills range from 'Log in procedure' to 'Communicate' and the related modules vary in the intented classroom management. The GISET part in the NIVO project will show teachers how online educational information systems can be used in their classroom or school situations. Teachers will be equiped with a basic set of skills, concepts and educational views which allows them and their pupils to incorporate this new medium in their educational practice (6).

b. GEONLINE

To maintain and support a large amount of information is very labourintensive. But much geographical information has already been stored in mainframe computers. The question of how to get this digital information used in schools by teachers and pupils was the basic idea behind GEONLINE. In this two years project (nov. 1987-nov. 1989) expertise on the market for geographical teaching material (Malmberg Educational Publishers, 's-Hertogenbosch) is combined with an accessible Digital School Encyclopedia (VNU Database Services, Amsterdam) and research and INSET experience with IT in education (Department of Geography for Education, State University Utrecht). One of the system designers of GISET (Coen van der Burg) will coordinate the research work for GEONLINE. On technical and educational aspects both projects will profit from cooperation. In the longer term GEONLINE probably will indicate the way in which the problem of educational information management might be solved. For Geography as an educational subject this project will add new possibilities of applying Information Technology in the curriculum.

9. Conclusions

...'Hand held computers little larger than today's calculators will enable students to connect data banks as might be provided by the Information and Documentation Centre for the Geography of the Netherlands, or a similar organization in another nation, and investigate a range of geographical problems. All of this will be possible from the student's home telephone as well as the classroom. As teachers and the trainers of geography teachers we must prepare our students for those technical frontiers. We must combine the best material our discipline has with which to complement computer assisted learning and press forward to deliver it in an educationally sound manner...' (J. Stoltman, 1984)

These words were spoken by Joseph Stoltman, IGU Commission of Education Chairman during the IGU supported CAL in Geography Conference in London, April 1983. Looking at GISET it might seem that we have worked out Jo's prophecy too literaly. We will not deny that the regularly contacts we are able to have generate a positive effect on concepts, strategies and policy. And GISET is one of the outcomes of this process designed to function in the national context of curricula and to fit into the Dutch educational system. Whether it is delivered ..'in an educationally sound manner..' needs subjecting to further research. Developments in information technology indicate that the online viewdata systems can easily link in with interactive video and even can disseminate photo quality images. One of the Geographer's needs in the nearer future will undoubtedly be a flexible tool that can grow into integrated systems for geographical education and information technology. Therefor we would encourage the setting up of more Geographical Information Systems as Educational Tools each considering national circumstances and possibilities but which then easily can be linked into an international network. Doing so we can offer our colleagues, students and pupils access to a powerful international form of GISET to explore new frontiers in geographical education for the year 2000.

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State University Utrecht
The Netherlands

Acknowledgements:

In designing and building the prototype of GISET as a system I am greatly indebted to my colleague Coen van der Burg. Good work done by Dominique Omes and Renate Hilderink as the GISET Editorial Board allows us to concentrate on the research and development work of GISET. Ashley Kent did me the favour of editing this paper and rectifying some of my deeply rooted mis-spelling of the English language.

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(1) See: J. van Beckum (1987) 'Raamplan ISPAK: the Geographer'sanswer to CAL Policy in the Netherlands'.
In: W.A.Kent (ed) 'Computer Assisted Learning in the Humanities and Social Sciences'. Oxford. 1987.

(2) Literature studies did not make clear that Videotex Systems designed for educational purposes are available yet. The flexible prototype system we choose (POSEIDON, from ECD, Delft) is installed on BBC machines and fits very well in the scale of our project.

(3) Recent publications on the Prestel Education Projects in the Humanities (and others) in the UK hardly contribute to this notion. PRESTEL was designed as a business system and the classroom experiments clearly display the friction between educational and business purposes.

(4) Using a viewdata communication package, a modem (1200/75 baud) and the right lead anyone can contact GISET. Dial (0)30-534564 in the Netherlands. Use as password '1111#' (twice) and GISET will open. There is a 'Welcome in GISET' in English available. Technical failures mostly relate to the wrong modem or line breakdowns, seldom to the GISET Host System.

(5) During the IGU Conference in Brisbane (AUG. 1988) more information about user experiences will be available.

(6) Separate from the NIVO Project we will run Advanced Workshops to make (still) better use of the GISET system and the possibilities. For example, we will teach teachers how to design their own or their students' information modules as part of a fieldwork, school project or individual study.

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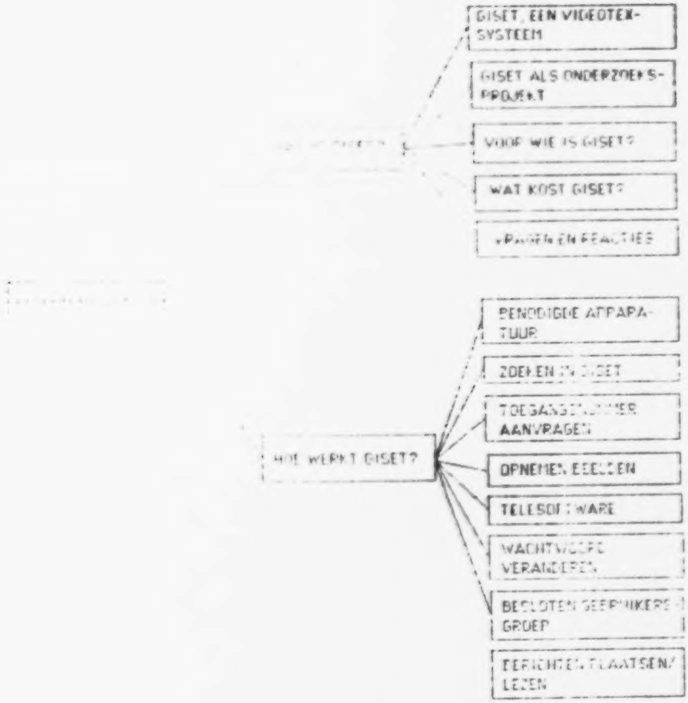
GISET, EEN VIDEOTEX-SYSTEEM
GISET ALS ONDERZOEKSPROJEKT
VOOR WIE IS GISET?
WAT KOST GISET?
VRAGEN EN REACTIES
BENODIGDE APPARATUUR
ZOEKEN IN GISET
TOEGANGSNUMMER AANVRAGEN
HOE WERKT GISET?
OPNEMEN BEELDEN
TELESOFTWARE
WACHTWOORD VERANDEREN
BESLOTEN GEBRUIKERSGROEP
BERICHTEN PLAATSEN/LEZEN

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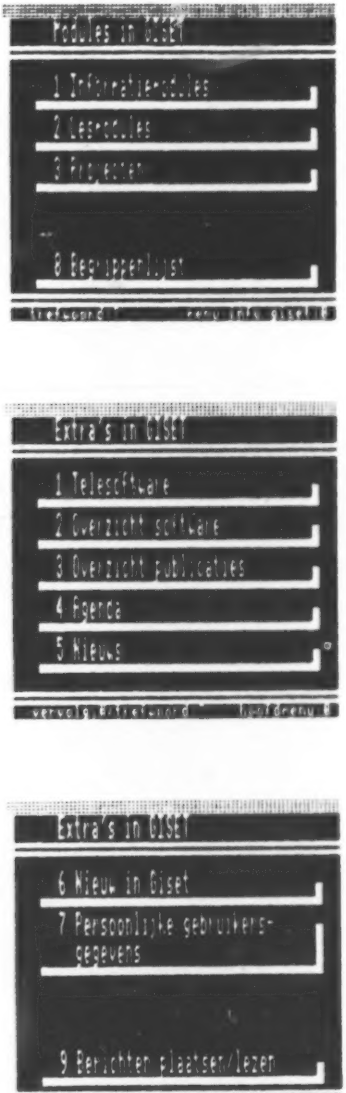

Modules in GISET

1 Informatiemodules

2 Lesmodules

3 Projecten

8 Begrippenlijst

trefwoord 1 menu info giset

Extra's in GISET

1 Telesoftware

2 Overzicht software

3 Overzicht publicaties

4 Agenda

5 Nieuws

vervolg #/trefwoord hoofdmenu

Extra's in GISET

6 Nieuw in Giset

7 Persoonlijke gebruikers-
gegevens

9 Berichten plaatsen/lezen

trefwoord hoofdmenu

Figure 5

Teaching Geography for a Better World

A handbook for teachers of geography due for publication May 1988.

[illegible]

This is a handbook for any geography teacher who is concerned to develop a teaching strategy and a curriculum which addresses issues of current and future global concern: that is, to teach geography 'for a better world'.

It is a practical book, offering detailed guidance, ideas and teaching material presented in an accessible and attractive format for ease of use in the classroom.

The chapters are written by leading geographers from around the world, and most of them appeared in the first Australian edition of this book. For this second 'international edition', the original material has been edited, revised, extended and completely re-designed.

Contents
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PERCEPTION OF BORDER REGIONS

Presentation of a Design for Investigating the Spatial Perception and Identification of 15-year-old Students in the French, Swiss and German Upper Rhine Region

Hartwig Haubrich

a. ABSTRACT

This paper discusses a research design. It contains a working plan, a model of regional perception and identification, a description of dependent variables as spatial identification, auto- and hetero-stereotypes and spatial preferences and independent variables as nationality, sex, language, parents' - and students' education and mobility. While some results will be presented in Brisbane, the research design shall be discussed in this paper.

b. INTRODUCTION

Investigating the spatial perception and identification of 15-year-old students in the French, Swiss and German Upper Rhine Region means researching their knowledge about and their attitudes towards their region.
15-year-olds are asked because they are approaching the end of their lower secondary schooling. After having left this level most students don't have Geography lessons anymore. At that point the students should be educated for a balanced regional, national and international identification.
The selected region embraces Alsace in East-France, the cantons Basel-Stadt, Basel-Landschaft and Aargau in NW-Switzerland and Baden in SW-Germany. This region is chosen because it belongs to three nations and therefore it can show how

international understanding can work. It also belongs to a common ecological and historical region but also to the present international planning region, the so called "Regio". It is characterized by the common Rhine Rift Valley between the Black Forest, the Vosges and the Swiss Jura, by symmetric vegetation zones, a common climate and common ecological problems. The entire region was settled by Kelts, Romans, Alemanns, Franks etc. It has the same historic village and town types. But politically it is divided by three states - a very federalistic state in Switzerland, a less federalistic state in Germany and a more centralistic state in France. Administration, education and government are quite different but culture and attitudes of people look like those of relatives. The border can easily be crossed and there is a lot of mobility, but never the attitudes of students towards the region have been investigated. Therefore we started to work on a research plan (table 1), on a model of regional perception (table 2), on dependent variables in order to describe regional perception and independent variables in order to explain regional identity. The following chapters will discuss this research design.

c. MODEL: REGIONAL PERCEPTION AND IDENTIFICATION

The entire environment with its natural and cultural features build the information basis for regional identification. Parents, neighbours, relatives, school, media and trips communicate information and attitudes on one hand, but on the other hand the perceiving individual selects out of the information potential according to his ability, knowledge, attitudes and values. So perceiving leads to mental maps and images. The information process is influenced by the interests and values of the mediators and recipients as well. The per-

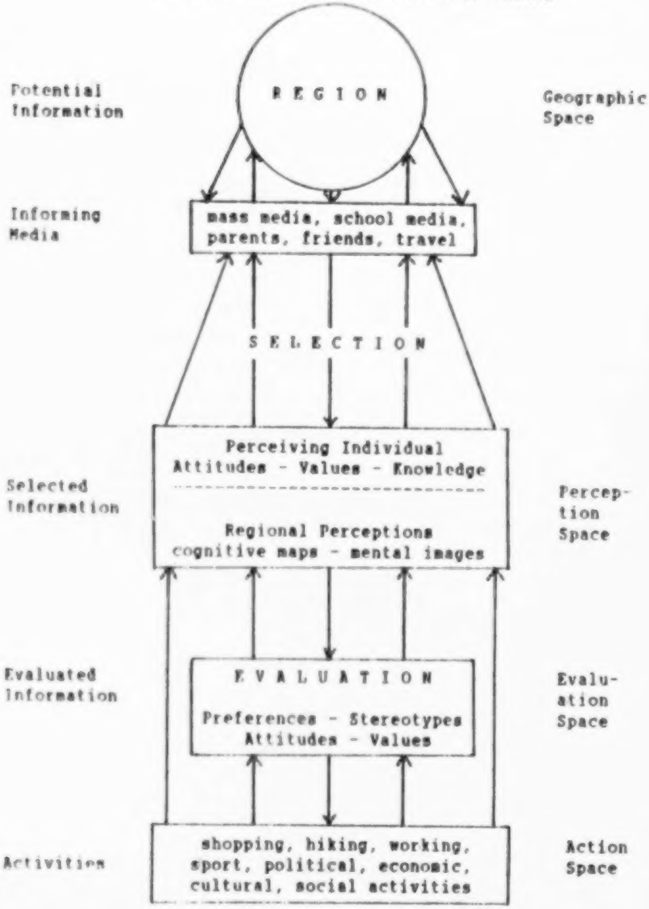
Table 1:
TIME- AND WORKING PlAN

Activities:	1985	1986	1987	1988
1. Bibliography	------------------------->			
- Regional Geography				
- Perceptional Geography				
- Perceptional Psychology				
- Research Methods				
2. File of Adresses	------------------------->			
- Regional "Experts"				
- Schools etc.				
3. Research Design	--->			
- Theory Building				
- Hypotheses Building				
- Variables Defining				
- Instruments Developing				
4. Pilot Study with				
- 12 year old students		X		
- 15 year old students		X		
- 2o+ year old students		X		
- 6o+ year old seniors		X		
5. Revision of		------>		
- the Research Design				
- the Research Instruments				
6. Conferences with experts				
- University Muhlhouse		X		
- University Basle		X		
- University Freiburg		X		
- European Council		X		
- Environment Centre at Muttersholtz/Alsace		X		
- Regio Basiliensis/International Planning Office		X		
7. Contacts with School Administrators in				
- Alsace/France		--------------->		
- NW-Switzerland		--------------->		
- Baden/Germany		------------------>		
8. Questionning of Students				
- in Alsace			X	
- in NW-Switzerland			X	
- in Baden			X	
9. Data Processing, i. e.				
- Storing				-->
- Processing				---->
- Verification or Falsification of Hypotheses				---->
1o. Research Report				---->
11. Developing Material and Concepts for International Understanding and Regional Identification		------------------->		
12. Inservice Training				---->

Table 2:

MODEL

REGIONAL PERCEPTION AND IDENTIFICATION


Potential Information
R E G I O N
Geographic Space
Informing Media
mass media, school media, parents, friends, travel
S E L E C T I O N
Perceiving Individual
Attitudes - Values - Knowledge
Selected Information
Regional Perceptions
cognitive maps - mental images
Percep-tion Space
Evaluated Information
E V A L U A T I O N
Preferences - Stereotypes
Attitudes - Values
Evalu-ation Space
Activities
shopping, hiking, working, sport, political, economic, cultural, social activities
Action Space

ceived environment becomes the evaluated space with images and preference. These have an impact on behaviour - for example on hiking, shopping, contacting people, cultural activities and so on. That way a perceived space becomes an evaluation and action space.

Within this very briefly described model one can find the variables and potential hypotheses which shall explain regional identification and which will be discussed now.

d. DEPENDENT VARIABLES

1. Spatial Self-Perception

One of the main objectives of the research project is to measure the spatial self-perception or the attitudes of the students towards people and places, i. e. their local, regional, statal, national and international identification. To get information about their solidarity with their own community, their district, region, state, nation and Europe the students are told the following:

"There are people who like their village or town most, others regard themselves at first as Europeans. Please write after each of the following terms different scores according your feeling. If you don't perceive yourself as European write: "0", if you regard yourself as European a little bit write: "1", more or less: "2", strong: "3", very strong: "4"! If you believe you cannot answer, then mark this term with a short line!"

Then the following is offered to the German students:

"I regard myself
as German:
as resident of my village or town:
as resident of the "Regio":
("Regio" is the term for the trinational planning region.)

as Baden-Württemberger:
(i.e. citizen of the state "Baden-Württemberg")
as Badener:
(i.e. resident of the German historic region"Baden")
as resident of the "Dreyeckland":
("Dreyeckland" is used by regionalistic or protest groups.)
as resident of the "Alemannischer Raum":
(i.e. term for the present international region, but also of the area of the old Alemannien tribe)
as resident of my district/county."

Similiarly the Swiss and French students are asked - the Swiss in German and the French in French. But it was very difficult to overcome the problem of the different meanings of terms as resident, member or citizen in the different languages. Also some administrative units as region, state, district, community, and canton have different meanings in the three countries. Only an intense cooperation with language experts could lessen this problem. The students need a same plateau to start with to rate the different identifications - otherwise the outcomes wouldn't become comparable. This plateau is the national identification.

Therefore the French students start with "I regard myself as French" and the Swiss "I regard myself as Swiss". The nationality has prooved to be an adaquate "anchor" to weigh different identities.

We expect different profiles of self-perceptions, i.e. different types of a more local, regional, national or international identification.

Additionally to the description of the different types we want to explain them with the independent variables.

2. Stereotypes

In order to find out stereotypes of the different groups - auto- and hetero-stereotypes - the students are told the following:

"Quite often you can hear people saying what typically Alsacien, Swiss or German is. Please write after each of the following adjectives a number how strongly every one fits:

0 - it doesn't fit.
1 - it fits a little bit.
2 - it fits more or less.
3 - it fits strongly.
4 - it fits very strongly."

Then for example the German students characterize at first themselves as follows:

"The 'Badener' are

industrious
peaceful
clean
talkative
parsimonious
friendly
old fashioned
clever
slow
rich
progressive
earnest
conscientious
ambitious
reserved
self-confident"

The same adjectives follow after "The French are" and "The Swiss are". It is very important that the students start to rate their own group or people at first. So every student compares his own group with the foreign group and starts with his own national value system.Not so much the absolute ratings are the interesting outcomes but the distances of the ratings between the same adjectives for different nationalities.

Also here we have the difficulty of the different understanding of adjectives within one common language community and

between different language groups as well. Clever, rich and so on is very often not the same for two different people even from the same culture, dialect, social strata and region. Also the translation of adjectives into a foreign language means a difficulty. (How is one to translate "gesprächig" - with talkative or communicative?)
Even different language experts offer various answers. Therefore we have not only one but more adjectives within a semantic profile which belong to special areas as social, emotional and cognitive characteristics. But it remains a "murmur", imprecision or lack of definition. Only the big number of probands (here more than 6000 students) can bring a balance into the differences and therefore insight into the "mémoire collective" or average understanding of a term.
Within the pilot study the students were asked:
"What adjectives do you remember when you hear "the Swiss" or "the Badiens" or "the French?" We received many interesting adjectives but not enough in order to describe social, affective and cognitive characteristics as well. Therefore we used for our main survey adjectives from our pilot study and from the well known semantic profiles from Osgood and Hofstätter.
We are asked by some teachers whether the adjectives of the rating scales do fix or cement eventually existing stereotypes and whether therefore such profiles would be pedagogically risky. Our answer is: Fixed ideas, biases and stereotypes only can be changed or flexibilized when one starts to think about them, and characterizing of people by a semantic profile can be the first step to become conscious about the own lack of knowledge about people.
Within the pilot study we used two poles-profiles as "rich - poor" with a seven point scale between the poles, but many less able students didn't mark only one point but two points

- one for rich and one for poor. That is the reason why we changed the original two-pole semantic profile into a one-pole one.

We expect from the outcomes different dimensions of characteristics - not really unfriendly characteristics but ratings of different cultural, regional and national particularities. Beside the description of the auto- and heterostereotypes we want of course to explain them with the help of the independent variables.

3. Spatial Preferences

In order to experience their spatial preferences the students are asked how much they would like to live in their own community and then in 5 main regions of each of the two other nations. For example the German students are asked:

Write behind every area a number how much you would like to live there:

0 - I absolutely don't like.
1 - I don't like.
2 - I like.
3 - I like strongly.
4 - I like very strongly.

If you don't have any information about a region please mark it only with a short line!"

Then follows for example for the German students:

"My own community ___
Strasbourg Region ___
Colmar Region ___
Mulhouse Region ___
Belfort Region ___
Vosges ___
Basle Region ___
Bern Region ___
Zürich Region ___
Swiss Jura ___
Swiss Alps" ___

For every nation we offer 5 different regions - regions of main urban areas but also landscapes as the French Vosges and the Swiss Jura. The Swiss Alps don't belong to the "Regio" but the pilot study showed us that the 15-year-old students knew the more distant Alps better than the more narrow "Regio" because they only crossed the "Regio" in order to ski in the Alps. This outcome we want to know now exactly. We expect different preference profiles and images for the different regions and are interested to experience what regions the students don't know. Also here we want to interpret the outcomes with the help of the independent variables as border crossing mobility, schooltype, education of parents, distance between home and foreign area, etc.

4. Knowledge

i. Knowledge of Place Names

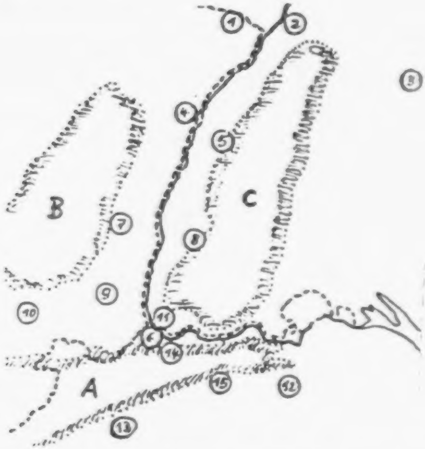


fig. 1: German, French and Swiss Border Regions at the Upper Rhine Valley

The students get a sketch map which shows the Upper Rhine Rift Valley between the Black Forest, the Vosges and the Swiss Jura and also the borders of France, Switzerland and Germany. In order to learn their knowledge of place names the students are asked the following:

"15 towns are marked by numbers and 3 landscapes by letters.

1. Please write the letters after the following landscapes:

   Vosges ___ Black Forest ___ Swiss Jura ___!

2. Please write the right numbers behind the following towns:

   Freiburg ___ Karlsruhe ___ Zürich ___
   Colmar ___ Mulhouse ___ Bern ___
   Offenburg ___ Aaarau ___ Belfort ___
   Lörrach ___ Wissembourg ___ Basel ___
   Stuttgart ___ Liestal ___ Strasbourg ___

3. Draw a border line around the area which is called Regio!"

We expect of course different intensities of knowledge of place names and are especially interested whether this knowledge is nationally, binationally or trinationally oriented, whether it is distance-dependent, whether it differs between North and South,between big cities and small towns, between urban areas or countrysides. Also here we will look at correlations of the outcomes with different independent variables. "Regio" is a quite new name for the trinational planning region. In a democratic country it is wanted that people participate in planning and development of their environment. Additionally in the "Regio" we want to show how international cooperation or "Mini Europe" can work. Therefore we are interested in the students' border lines and extensions of the "Regio" whether there are Micro- or Macro-"Regios", national, binational or trinational "Regios", etc.

The outcomes will be interesting for polticians and pedagogues as well, and we are looking forward how we can explain the students' regional perceptions with independent variables.

ii. Regional knowledge

According to the assumption that knowledge about a region belongs to regional identification we tried to structure knowledge and choose questions out of the following knowledge fields:

geology, geomorphology, hydrology, climatology, vegetation, agriculture, industry, energy, traffic, history, politics, rural and urban settlements, culture, leisure, food, historic persons (humanists: poet, philosopher and physicist), present people.

Very often it is asked what the three national parts of the "Regio" have in common.

One can easily see that not every field belongs to Geography, that regional knowledge, which helps to develop regional identity, means knowledge from a broad variety of disciplines or fields. Even regional songs and literature belong to the fundamentals of regional identification.

It may happen that the outcomes will be:

the more knowledge the stronger the regional identity or the broader the variety of knowledge the more intense the regional identification.But it is also thinkable that only few, but very special fields of knowledge - for example folklore or customs - are identity-building.

We don't know that yet, but we know from our pilot studies that most students had basically very little knowledge about geography, history, politics, economics etc. Therefore we had to reduce the number of knowledge questions in order to avoid demotivation of the students. This led to the problem that the remaining questions couldn't represent an entire knowledge field but only function as signals.

In order to save time - the student cannot work on a question-

aire longer than an hour - one is forced to develop a very practicable method. But this leads to the danger that only factual knowledge is asked. We were very conscious of that and asked also structural and problem questions.
For example, locating rivers indicated factual knowledge, finding a rift valley or volcanic area or knowing a centralistic state meant structural knowledge, and adaquate understanding of smog, water pollution, acid rain and urban sprawl meant problem knowledge.
Behind these questions one can find a kind of pedagogical philosophy, i.e regional identity should be based on broad knowledge, knowledge about historic features but also current affaires, not only fact knowledge but also structure and problem knowledge. There are conservative groups who want to educate people for their regional identification only with history and tradition - denying current environmental, economical and political problems. But there are also protest groups who stress only the present problems and some of them haven't enough knowledge to analyse or evaluate our current problems in order to help to solve them.
We are very curious how much knowledge the students have and what kind of knowledge is correlated with what intensity of regional identification. One of the next important interrelationships to be analysed is that between regional perception and border crossing trips with special activities within the "Regio".

e. INDEPENDENT VARIABLES

The independent variables which help to explain the dependent variables are the following:
nationality, age, sex, language, language competency of the students and their parents, i.e. understanding, speaking and/

or writing of standard German, French, Swiss German, Alsacien and Badien dialect, language used at home, school performance in language(s), mathematics and geography, education level of parents and mobility.

1. Social data:
In Switzerland, France and Germany as well we have many students of other nationalities. How these know and use the region and how they develop relations with people and places in the "Regio" may also become an interesting outcome of the survey. Of course to know the differences between the French, Swiss and German nationalities will remain the main goal. Meanwhile the differences between male and female students belong to the standard questions of an empirical investigation.
German writing is more or less the same in Switzerland as in Germany, but the everyday language in Switzerland is Swiss German. In the German part of the "Regio" the students speak standard German in schools and with foreigners, but the majority speaks Badien dialect at home and only the minority standard German.In Alsace the official language is French. Therefore every student is of course able to speak French, but those who didn't immigrate from Central France, i.e. the original population - at least the elderly - speak also Alsacien dialect, which is German, because most people in Alsace, Baden and NW-Switzerland originated from the German tribe of"Alemannen". In Switzerland every student has to learn French in school, in Baden more and more French classes are introduced. The communication between the only French or only German speaking groups should be the most difficult one but our recent experiences showed that the relations between Alsacien and Badien people are better than between Swiss and Germans.

Language is either a barrier or a bridge of communication. But international understanding cannot be developed only through language but also through geographical knowledge. Therefore we want to know the students' performance in Geography but also in Mathematics. Mathematical and language comepetency is used as a signal for the general intelligence which shall be correlated with regional knowledge and attitudes. There are many schooltypes in Germany, France and Switzerland as well. They have different profiles and different ability levels. Therefore we want to know how the schooltypes but also how the primary, secondary and tertiary education level of the parents have an impact on the regional identification. Perhaps the influence of families is more important than the impact of schools.

2. Mobility

Because mobility can be cause and effect of regional identity, it can be used as independent and dependent variable. In order to experience their border-crossing, but interregional mobility, for example, the German students are asked the following:
"How often did you visit the following areas since 1.1.1984? Please write after the different areas the estimated number of visits!

Strasbourg Region ___
Colmar Region ___
Mulhouse Region ___
Belfort Region ___
Vosges ___
Basle Region ___
Bern Region ___
Zürich Region ___
Swiss Jura ___
Swiss Alps ___ "

These regions are the same as those of the spatial preference analysis. So preferences and visits can be compared. But the German students are also asked the following:
"With whom did you cross the border?

	Alsace	NW Switzerland
with parents	______	______________
with friends/youth club	______	______________
with school	______	______________

If the students travel with their parents probably the education of the parents will become very important. If they travel with their friends or clubs we have an indicator that the region belongs to their real self-determined action space. The trips with school show how consciously teachers seek international understanding and cooperation with their neighbours.

The next question the students answer is: "What did you do there? Please mark the appropriate activity!

	Alsace	NW Switzerland
Hiking/sightseeing	______	______________
Shopping/eating	______	______________
Sport activities	______	______________
Visiting people	______	______________
Visiting discos, theatre.	______	______________
Political activities	______	______________
Contacting youngsters	______	______________ "

It may be that students mainly do shopping but not visiting people and contacting youngsters, but it also may be that they visit discos but don't communicate with people from that area. The questions about the activities at the other side of the borders have the function to discover how these parts of the region belong to the physical and social environment and action space of the youth.We believe that the satisfaction of basic and other needs in an environment is the best basis for the identification with this region. Therefore we are curious whether we can verify this hypothesis or not. We also want to know the residence mobility of the students' families. It may be that there is a difference of regional identity between those who have lived in the region since their birth and those who belong to the so called "new citizens". The students are also asked to give information about the holiday countries and the border-crossing but interregional trips of their parents. Perhaps many families visit many remote countries but they don't know their narrow home region. To see how this variable influences regional identity is also one of the objectives of the project.

SUMMARY

Because there hase'nt been enough space, this paper couldn't describe the entire research project on the perception of border regions. Therefore it reported only about the designing process - how to find geographical and methodical literature, how to build hypotheses and theories, how to find advice and help from experts or "Delphi", how to overcome language barriers in an international project. It showed how much time and effort are necessary to do a pilot study and all the above mentioned activities till one can start to collect and process empirical data.

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International Project on Geographical Achievement of Students

Günter Niemz

Abstract: Success is what matters most in teaching geography. Many teachers agree that student achievement is a major, if not the most decisive aspect of this success. However, very little research is being done in this field. Measuring student achievement on a national level is necessary for the students themselves, and to improve geographical curricula and teaching materials. But also on an international level a comparison of student achievement may help to improve curricula and the position of school geography in various countries. Therefore an international geography achievement test is being developed, and geography teachers all over the world are asked to cooperate in this project.

1. Necessity of Measuring Student Achievement

The objective of most human activities is success. This is true with geographical education in schools, too. However, very little is known about success in geographical education. Though some research has been done in this field in a few countries, there are not many publications on what matters most in geography teaching. Why? In my opinion there are two main reasons for this surprising fact: a) Though many geography teachers agree that achievement is the most decisive factor in success, they disagree on what they consider most important in geography teaching.
b) It is rather difficult to measure the success of

our teaching of geography.

Obviously, grades in report cards do not provide the information we are looking for, mainly for three reasons:

a) Grades in report cards are the result of many components, like achievement, cooperation in class, quality of homework etc.

b) Teachers usually grade their students by comparing their achievements with those of their classmates, i.e. group referenced and not criterion or teaching objective referenced.

c) Grades in report cards cannot provide information on achievement in different fields of geography, like regional geography, topical geography, location of places, map reading etc.

In a recent survey on geography teaching in West German schools the distribution of more than 150000 geography grades in report cards resembled closely the Gauß-curve for large populations (Niems, 1988, fig.8). Moreover, we found that on the whole boys get better grades in geography than girls, a surprising fact, which has already been discussed at the International Geographical Congress in Paris 1984, and which needs further investigation. But report cards cannot give us detailed information on achievement.

Why do we need detailed information on achievement?

a) Pupils should know, in which fields they have done well, and in which fields further study is necessary.

b) Teachers should know, to which extent their students achieved their teaching objectives. Success is stimulating. A proverb says: Nothing is more successful than success.

c) Textbook authors and educational authorities responsible for geographical curricula and syllabuses can find out, whether it is adequate what they have planned, and how they can improve their teaching objectives, their texts and their materials in textbooks etc.

2. Improvement of Curricula through Measuring Student Achievement

Many teachers in Germany - and probably in some other countries as well - do not like testing, and in particular multiple choice items. Though, no doubt, tests and multiple choice items have some disadvantages, too, multiple choice tests are the best and most economic method for objective, reliable, and comparable measuring of geographical achievement of large populations of students at the present time.
After the reform of geographical curricula in the 1970s we applied this method in West German schools. The results of these tests, some of which were presented in a paper at the International Geographical Congress in Paris, helped to improve our geography textbooks and curricula (Niemz 1984, theme 15.12). If such a success is possible on a national level, it should be possible on an international level, too.

3. First International Geography Achievement Test

The first international geography achievement test was developed by J.P.Stoltman and G.F.White for pupils at the age of 11 or 12 in industrialized countries. The 20 items of this test were divided into six geographical categories (environmental characteristics, physical geography, cultural geography, human/land and economic relationship, photo-land classification, world place knowledge) and three cognitive levels (geographic information recall, application of geographic principles, analysis of geographic elements and relationships)(Stoltman 1984,32). The test was administered in fall 1983 to 595 students in eight countries (Australia, Canada, France, Japan, Sweden, Switzerland, United Kingdom, United States). The sample size per nation was between 50 and 145 students. The mean score per national sample ranged from 54.1% to 40.5% (Stoltman 1984, 33), indicating rather low achievement over all. Concerning the different geographical categories poor results were found for items of the categories 1, 2, and 4, somewhat better results in the categories 5, 6, and 3 (Stoltman 1984, 34). Stoltman's conclusion: Improvement of geographical achievement of students of this age group is urgently necessary.

In 1985 this same test was administered to a sample of 211 sixth grade pupils in West German schools. The mean score was 51%, 54% for boys, 50% for girls. The results concerning items of the different geographical categories are shown in table 1.

Table 1: Proportion of Correct Responses by Geographic Component in the West German Sample

Geographical Category	1	2	3	4	5	6
Boys	.41	.55	.53	.52	.58	.62
Girls	.34	.38	.52	.47	.57	.57
Over all	.38	.48	.54	.48	.64	.59

Again, we found rather poor results in the categories 1, 2, and 4, better mean scores in the categories 5, 6, and 3. And again, boys did better than girls. As the results of the Stoltman study and of the West German study point into the same direction, we can say that probably some of the items in the categories 1, 2, and 4 are too demanding for this age group.

4. Inter Geo Project

During a visit in Kalamazoo, Michigan, conclusions from the first international geographical achievement test were drawn, and an improved international geographical achievement test was planned. To make sure that the participating students have had several years of geographical instruction in secondary schools, the eighth grade (students at the age of about 14 years) was chosen, and as many nations as possible are invited to cooperate.

Of course, such an Inter Geo Test cannot be based on any national curriculum, but the items have to be selected according to what can or should be expected of eighth graders. This seems to be the most crucial point. To achieve what may be called relative competency in dealing with matters of geographical relevance in everyday-life during the last decade of the 20th and the first half of the 21st century, students who are now in eighth grade, should in our opinion

a) have some idea of the location of continents and countries, as well as major mountain ranges, water bodies, islands, rivers, deserts, capital cities and other big cities,

b) have basic knowledge of geomorphology, weather and climate, geology and pedology, the Earth as a planet, the influence of our solar system on Earth and its position in the universe,

c) have an overview of human geography, e.g. population, cultural and religious regions, agricultural and industrial areas, rural settlements and cities, major traffic routes etc.,

d) have some knowledge of their own country, of world powers, of major political and economic alliances, and of some developing countries,

e) have the ability to read maps, diagrams, and graphs, and to interpret texts and pictures,

f) have some idea of the impact of human activities on the environment and its consequences.

According to this list the test should consist of six parts. As, however, environmental problems are rather difficult and mainly discussed in higher grades, we decided to include a few items of this category in other sections of the test, which now consists of five parts.

Of course, the items should represent different cognitive levels. The majority of the test items for that age group will refer to knowledge, but there should be at least some items requiring understanding or even transfer and application of knowledge or skills.

The next problem is how easy or difficult the items should be. In this respect we have to keep in mind

a) what pupils of that age are able to cope with according to our teaching experience and

b) which stage the pupils should have reached at that age in order to achieve relative competency at the end of their school career.

In many of our West German geography tests, e.g. Achievement Tests Geography (LET GEO) or tests of the German Geographic Curriculum Research Project (RCFP) we found that our students achieved about 65% correct responses on an average (Niemz, 1988, figures 9, 10). Therefore we think that our test development teams have a fairly realistic conception of what pupils at a certain age are able to do.

Items concerning location of places do not pose any major problems, but we had to make sure that each continent was represented in the test. In Regional Geography the items should allow the students to prove that they have an overview, but questions about details of any area should not be included. In Human and Physical Geography items from different chapters were selected. With regard to geographical skills mainly map reading and interpretation of graphs should be tested. Pictures were not included, as possibly reproduction problems might arise in some countries.

Now test items were developed and gathered in an item pool. A first test version was sent to some colleagues in Australia, Japan, Canada, and the United States. Recommendations from these colleagues were used to improve the test.

Examples for items requiring knowledge are:

Which crop is grown mainly in tropical areas?

A Rye.
B Oats.
C Rice.
D Barley.

Which statement about Japan is correct?

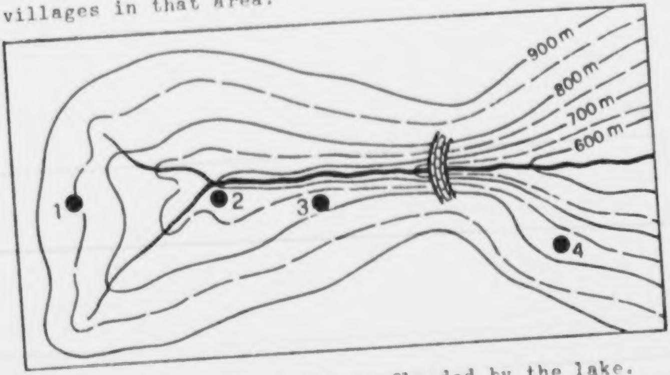
A The country is rich in iron ore and crude oil.

B There is enough space for the expansion of cities and industries.

C The Japanese are mainly Hindus or Moslems.

D Frequent natural hazards are volcanic eruptions, earthquakes, and typhoons.

An example of an item requiring understanding is: A water reservoir is being planned. The water in the lake behind the dam will rise 150 metres above the existing river level. What will happen to the four villages in that area?



A All four villages will be flooded by the lake.

B Just Village 2 will have to be evacuated.

C Villages 2 and 3 will be flooded by the lake.

D Villages 1, 2, and 3 will have to be evacuated.

Problems may arise with items requiring application, i.e. the students have to add some information that is not given.

In the following item they have to add the information that on the southern hemisphere winter is in July.

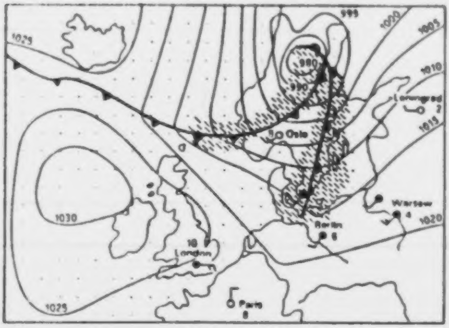
In the City of S..... the average monthly temperatures are

Month	J	F	M	A	M	J	J	A	S	O	N	D
Temperature C°	22	21	20	18	14	12	11	12	15	17	19	21

In subtropical zones the average temperature of the warmest month is above 20°C, and of the coldest month between 2° and 13°C. In tropical zones the average temperature of the warmest month is above 20°C, and of the coldest month above 13°C.

The City of S..... is located

A in the subtropical zone of the northern hemisphere,
B " " tropical " " " " " .
C " " subtropical " " " southern " .
D " " tropical " " " " " .


1025
995
1000
1005
1010
980
990
Leningrad
7
1015
Oslo
1030
Warsaw
4
1020
Berlin
6
10
London
1025
Paris
8

According to this weather map, what is the best weather forecast for the next day in Oslo?

A The wind will come from the east.
B It will start raining again.
C The temperature will rise.
D The air pressure will decline.

5. Conclusion

The main purpose of presenting the planning procedure and some items of this Inter Geo Test during the symposium in Brisbane is

a) to find colleagues in different countries who are willing to cooperate in this project,

b) to further improve the test,

c) to plan the work ahead.

The purpose of the whole Inter Geo Project is

a) to get information on geographical achievement of students in different countries,

b) to enable teachers, textbook authors, and curriculum planners to improve their work by concentrating on those topics in which students of other countries achieve better results,

c) to convince educational authorities to improve the position of geography teaching in their countries by presenting to them an international comparison of student achievement in geography.

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A 'GLOBAL' CITY STUDY AT FORM 6 LEVEL TO DEVELOP STUDENTS VISUAL SKILLS USING TOKYO AS A CASE STUDY

Phil O'Malley

ABSTRACT

This paper examines one of the prescribed common topics of the co-ordinated Form 5-7 prescription introduced into New Zealand schools in 1986. The new syllabus is characterised by a concept-skills based approach.

It offers broad national guidelines with a small compulsory core content at each form level. A bank of skills has been devised outlining the range and extent of skills that could be introduced into geography programmes. They are to assist students in gaining and using information and in understanding geographic ideas and concepts.

The objective of this paper is to suggest ways by which students can grasp the complexities of macro-scale urban settlements. In essence the rationale is to design skill based activities with a high visual content. Tokyo is the focus for these exercises which are based on visual resources and data collected by the author on a visit to Japan in 1986.

NEW SYLLABUS OVERVIEW

The introduction in 1986 of the co-ordinated Form 5 to Form 7 national guidelines and prescriptions, has given a new focus and impetus to the teaching of geography in New Zealand secondary schools.

Regional/thematic paradigms of previous prescriptions have given way to a more flexible concept/skills based approach. 'Banks', representing collections of items for use as components in teaching programmes, have been designed to assist teachers in their planning. Teachers can draw items from the 'banks' that relate to the needs and interests of their students and that utilize the resources of the local area.

Of the seven banks, the skills bank is one of the most important. It is a significant component of most, if not all, learning tasks and the particular ability or competence can be observed or measured.

The skills bank - "G6 Skills in Geography", outlines the range and extent of skills that could be introduced into different class levels. It stresses that skills should be developed using a variety of resources in varied learning activities.

Figure 1 shows an organising framework for a bank of skills in school geography. Four sets of skills are used in geography. Thinking Skills, Practical Skills, Social Skills, Valuing Skills. All these are interrelated and can lead to Decision Making. One of the key practical skills listed relates to VISUALS, an aspect that will be considered in more detail

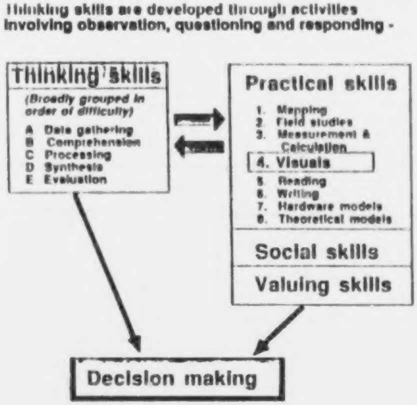
Thinking skills are developed through activities involving observation, questioning and responding -
Thinking skills
(Broadly grouped in order of difficulty)
A Data gathering
B Comprehension
C Processing
D Synthesis
E Evaluation
Practical skills
1. Mapping
2 Field studies
3. Measurement & Calculation
4. Visuals
5 Reading
6. Writing
7. Hardware models
8. Theoretical models
Social skills
Valuing skills
Decision making

Figure 1   An organising framework for a bank of skills used in school geography.

later in this paper.

At this point it is necessary to give a brief overview of the New Zealand Co-ordinated Form 5-7 Syllabus. There are four main sections. Topic Studies, Local Studies and Global Studies are school selected and comprise two-thirds of the available time allocation. These three sections follow the national guidelines utilising the various banks. The fourth section, Prescribed Common Topics, are the compulsory core and comprise one third of the available time allocation. Focussing questions indicate the range and depth of treatment for each topic. These four sections need not be taught separately but may be arranged in any format depending on the particular school.

This paper examines one of the prescribed common topics at Form 6 level viz Urban Settlements and suggests ways by which students can grasp the complexities of macro-scale urban settlements. In essence the rationale is to design skill based activities with a high visual content.

The problem facing the teacher is how to make these global cities comprehensible to students. Many of the cities studied, such as, Buenos Aires, Lima, Sao Paulo, Beijing and Tokyo have scant media exposure and are at the end of the world as far as the students are concerned. London, Paris, New York and Los Angeles have greater exposure on film, television and newspapers and are therefore better known.

TEACHING THE GLOBAL CITY

Figure 2 is a suggested organising framework for studying global city topics. Tokyo is used as a case study. The objective is to develop key urban concepts viz growth, patterns, processes, landscape and culture through activities based on relevant and interesting resource items. These are

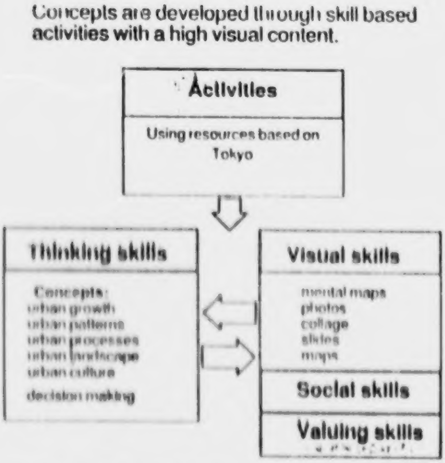
Concepts are developed through skill based activities with a high visual content.
Activities
Using resources based on Tokyo
Thinking skills
Concepts:
urban growth
urban patterns
urban processes
urban landscape
urban culture
decision making
Visual skills
mental maps
photos
collage
slides
maps
Social skills
Valuing skills

Figure 8 An organising framework for studying 'global' city topics

chosen to give maximum visual impact and each activity is built around a specific type of visual resource viz mental maps, photos, collage, slides and maps. In each activity questions are designed to develop students practical skills which involve a wide range of psycho-motor and cognitive tasks. The aim of each activity is to come to a closer understanding of a particular urban concept through the practise of a specific visual skill. Both facets, skill development and concept development, are interdependent but learning is more effective if practical skills precede cognitive skills in the learning sequence. Practical skills, especially if they have a high visual impact, tend to reinforce cognitive development and have a greater retention rate. Similarly learning appears to be reinforced when the activity makes a demand on the students decision making capability. Usually decision making simulation exercises involve working in groups, sharing ideas, resolving value conflicts and making consensus decisions.

Simulation exercises have a high student appeal. Much of the success of simulation depends on the students ability to visualise the situation and make choices from options. To have the desired impact the simulation exercise needs to be presented in a way that is highly visual.

It is estimated that 75-80% of all learning comes from the visual sense and only 15-20% through listening. Traditionally, teaching has tended to reverse these percentages by an emphasis on learning through listening. In organising this unit on Tokyo there has been a conscious attempt to design activities that have a high visual content.

OUTLINE OF ACTIVITIES

The following skill based activities have been designed to develop concepts in urban geography.

1 **Mental Maps**

This activity would be in the nature of a pretest to find out student preconceptions about Tokyo - starting from where the students are at. They are asked to draw an outline map of Japan and locate Tokyo on it. After comparing and discussing the results students are asked to record their impressions of Tokyo - what comes to mind when they think of Tokyo. These impressions could be quickly listed on the blackboard by the teacher - Taba style - in random order about the heading TOKYO.

By this method of revealing both individual impressions (exercise book list) and class impressions (blackboard list) both the students and the teacher can start the learning process from square one. As a follow up the items listed on the blackboard could then be categorised under three headings FACTS, OPINIONS, NOT SURE (further research needed).

Feedback on this activity could reveal stereotyping and misconceptions about Tokyo. The same mental map exercise could usefully be given at the completion of the unit to compare growth in students understandings and skills. They might for instance be given the task of drawing a full page mental map of Tokyo and its hinterland.

2 **Collage: Impressions of Tokyo**

The activity builds on the exercise above. This time students will study a collage of eleven photos and hopefully their impressions and feelings about Tokyo will be more specific and realistic. At the conclusion of the activity they will be encouraged to formulate two generalisations about the personality of Tokyo.

Student Guidelines

Study the resource item: Collage on Tokyo and answer the following questions.

1 List 4-6 impressions (ideas or feelings) you have about Tokyo by studying the collage.

2 Write numbers 1 to 11 down the margin of your page corresponding to the 11 photos on the collage. Then give each photo a title that sums up what is shown in the photo.

3 After the class discussion on Question 2 above, formulate two carefully worded generalisations about the personality of Tokyo.

3 **Photograph Interpretation**

Four photographs show scenes of Tokyo life and landscapes.

The emphasis in this activity is in developing concepts about the urban area through utilising practical and valuing skills. The full activity for classroom use is set out below:

Student Guidelines

The four photographs show scenes of Tokyo life and landscapes. Answer the questions about each photograph.

Photograph A

1 A Draw a full page sketch map showing the various commercial and residential zones. Also show the distant mountainous relief.
  B Plot in two major transport links.
  C Mark in an arrow pointing to Tokyo Bay.

2 What evidence can you cite from the photo that Shinjuku sub-centre is a recent development.

3 Give two reasons why this sub-centre (6 km from the Tokyo Central Business District) is located here.

4 Write two carefully designed generalisations about the urban landscape as depicted in the photo.

Photograph B

1 Which direction was the photographer facing when taking this photo. Give evidence from the photo for your answer.

2 Write a one page description of this scene mentioning any similarities and differences to a typical street scene in any major New Zealand city.

Photograph C

1 A Estimate the number of swimmers in the main pool.
  B Estimate the number of people either sunbatheing or waiting for a swim.
  C i Calculate the number of people (in the pool) per square metre.

  ii Calculate the number of people in the pool per square kilometre equivalent.

2 Give two probable explanations for the concentration of people on this recreational resource.

3 In what ways might this photo reflect some of the problems and resultant adaptations of people living in Tokyo.

Photograph D

This photo shows the Asakusa Kannon temple said to be founded in the 7th Century.

1 How important are shrines and festivals to the Japanese people.

2 Photographs A, B and C could be said to be similar to other modern cities throughout the world and photograph D is unique to Japan. Would it be true to say that culture and tradition are the real factors that give character to a nation and uniqueness to a city. What are your views on this.

3 From your study of the four photographs of Tokyo write down two or three generalisations about the personality and uniqueness of Tokyo.

4 **Slides on Tokyo**

Slides, filmstrips and video tapes are very powerful visual resources for deepening students understandings of urban geography. In fact, it is difficult to imagine successfully teaching a unit on a 'global' city without this kind of media imput. The problem often is that slides and filmstrips date very quickly while film and video tapes often only have small snippets of geographical value. There is a constant need for geographers worldwide to update such visual resources in their own countries. Recently, for example the International Society for

Educational Information Tokyo produced an excellent slide set (60 slides) on Tokyo with an audio tape commentary in English. This is part of the 'Japan of Today Series' No XVI Tokyo - 1987.

The author has produced a slide set (24 slides) as part of a teaching unit on Tokyo.

Below is an outline of the follow-up exercises for class use.

From the slides complete the following exercises.

Exercise 1

Draw up two columns, the first titled "Traditional Features", the second titled "Western Influences". Then list as many features as you can under each heading that are characteristic of Tokyo.

Exercise 2

Write down three things that surprised you about Tokyo and say why:

i I was surprised to learn .....

ii I was surprised to learn .....

iii I was surprised to learn .....

Exercise 3 .

A List three advantages of living in Tokyo and give a reason for each.

B List three disadvantages of living in Tokyo and give a reason for each.

Exercise 4

Write a page describing why Tokyo, although different from New Zealand cities, would be worth visiting.

Exercise 5

A With reference to slides No 1 and No 4 describe and explain the factors that have favoured the growth of such a large urban population.

B What other factors, not shown on the slides, may also help to explain such a large population?

SCHOOL TRIALS

The sample activities outlined above will be trialled by four Christchurch geography teachers in their Form 6 classes during the first half of 1988. At the conclusion of the unit on Tokyo, teachers and students will evaluate their teaching-learning experiences. To what extent did the emphasis on visual resources and skills facilitate and reinforce learning.

CONCLUSION

As educators, geographers have the opportunity of utilising a wide range of visual resources. In future we need to be more aware of their potential for developing skills and concepts. Also geographers worldwide need to be constantly updating visual resources for teaching so that a wide variety of stimulating visual material is available to the classroom teacher.

It is my belief that if the quality of teaching and learning is to be improved geography teachers need to design imaginative activities which motivate and challenge students. Putting a greater emphasis on visual skills is a positive way in achieving this goal.

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Children's Conceptual Development Seen Through Their Drawings

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INTRODUCTION

Two surveys of children's drawings were carried out, in Hong Kong, as part of the Geography PGCE course, looking at the growth and development of children at school, their spatial perception, mapping ability and graphicacy. The surveys were undertaken partly for demonstration to PGCE students and partly for personal interest. Neither was intended to be a piece of truly empirical research, and this report is a summary of the findings rather than an attempt to draw definitive conclusions.

The drawings were arranged according to the class/level in school. Drawing/artistic ability was not taken into account in either survey. The idea of developmental stages, similar to those outlined by Piaget, proved generally suitable for commenting on the drawings.

SURVEY I

This survey gave a vertical developmental profile from kindergarten (youngest 4 years 9 months), through Form 4, (oldest 16 years 3 months). There were 54 kindergarten, 173 primary and 161 secondary students in the survey, (total 388). It attempted to illustrate by their drawings, how children begin to group together familiar items of the landscape, gradually seeing them as a coherent whole. Every teacher was given the same, written instructions and asked to adhere carefully to them:

> 'Do not tell the children how to do it - although you may keep on repeating the instructions. If they ask whether they are to draw a map - you may answer 'you can if you want', but make it clear that all the work is to be their own idea.
>
> Say: "Make a drawing of an island
> Put some houses on it
> Draw some roads on the island
> There are mountains in the middle"

Hong Kong has a ria coastline with many steep slopes and islands. Four dominating features of the landscape in Hong Kong, islands, mountains, roads and houses were selected, as it was assumed that all children would have some concept of each. Thus the children were asked to draw what they knew, rather than what they saw. They had to produce something from their stored imagination - a stereotype or 'canonical' view. The specific aims of the survey were to find out:

1. whether there was any pattern, or sequence, in the way concepts of island, mountain, houses and roads (the elements) were linked together in coherent form
2. an approximate average age at which the majority of any class showed understanding and skills in representing selected geographical concepts through drawing

3. at what age/stage children draw 'maps' i.e. when they choose to convert three dimensional images to two dimensions; also the effect of being taught contours

The sequencing of the elements

The sequence in which the elements appeared on the drawings was house, road, mountain and island. Houses were usually drawn with pitched roofs, only later as flat-topped apartment blocks - the most common in Hong Kong. It is interesting how many showed smoke from the chimney, since open fires and chimneys are very rare.

The concept of roads was important. They were drawn quite early but did not appear to have any clear function. Later they obviously served as links, and finally some sort of network appeared. Roads existing independently of other features, without implying that they were links, seemed to indicate topological proximity.

Mountains were drawn very early - not surprising in view of their dominance in the Hong Kong landscape, their frequency in Chinese landscape paintings and in Alpine trade calendars. In many drawings, a mountain seemed to be equated with an island, which is understandable in Hong Kong, since islands rise steeply from the sea, especially 'The Island' i.e. Hong Kong Island.

The idea of an island seemed to develop in three stages. At first it was drawn as a mountain i.e. inverted U, often with mountains added to the top. In the second there was clear understanding of an island, as associated with the sea, which was clearly drawn in front or at the sides. The third stage showed the island as an entity, defined and enclosed by a continuous line. The first two stages appear to be topological, the last is probably projective and it is not until this stage is reached that the geographical concept of an island, as surrounded by sea, has been acquired.

Criteria used for stages in grouping the drawings

The final criteria for grouping were decided after scrutiny of the drawings seemed to reveal stages of increasing maturity in being able to weave the concepts together, understanding them as landscapes and representing them in drawings. The most simple are those containing one element, in each case a house, Figure 1. The next stage moves from showing more than one element - although they are separated from each other, Figure 2. - to where the elements are joined, in an 'accretionary' manner, i.e. they are added or stuck together, Figure 3.

There seems to be a series of steps, or plateaux, in children's ability to represent their concepts, the first occurring after stage 3. In stage 4, the elements are drawn as coexisting in some likely conjunction, beginning to form a picture. In this stage some concept of an island, as associated with the sea, is also apparent, inferred by a line, waves, boats or fishes, Figure 4. The second step is to stage 5, when the island is clearly conceptualized as having a finite boundary, encircled by sea, illustrating Piaget's 'enclosure', Figure 5. In stage 6 the island is no longer seen from the horizontal, but from an oblique view, a stage later subsumed by stages 7 and 8.

The third step occurs when the island seems to be envisaged as an organized community, stage 7. Although roads are often merely placed on the drawing, Figure 6, they are usually seen as links and associated with houses, Figure 7, while in stage 8 they are drawn as networks, Figure 8. In stage 9 houses are given a three-dimensional appearance. (This classification is later subsumed by stages 7 and 8).

Stage 10 is transitional, including maps in a variety of styles, where some items are shown in two-dimensions. Some have fanciful names. Understanding the map as a medium for communication of information is now apparent. In stage 11, contours, hachures or a block of solid colour suggest an attempt to show relief in two dimensions, but contours are not always understood. On one map representation may be mixed, in two and three dimensions. Figure 9. The ability to choose to reduce all three-dimensional features to a two-dimensional map or plan marks the fourth step, to stage 12, Figure 10, an Euclidean repesentation.

Comments on age and stage

It was very clear that within any group, chronological age was not significant. Referring to the preschematic stage, from about 4-7 years, Cox (1986:105-6), says the child does have prior intentions about what objects she wants to draw. Nevertheless, she encounters many difficulties and her drawings are characterized by 'failed realism'. This would seem to describe much of the work done by KG.1 (average age 5.3). Four appeared to be able draw only one element - the house. In three of the houses a person was drawn inside, nearly the same size as the house. Five drew pictures which placed the elements near or just touching each other - perhaps illustrating Piaget and Inhelder's topological proximity - and seven fastened the elements to each other. Four, thought possibly to have the concept of an island (demonstrating 'enclosure of the elements') might in fact have been more correctly placed in the accretionary stage. Horizontal separation commented on by Cox (1986:114) was noticed. Probably 16/22 had a practical understanding and also even a mental image of the words but had difficulty in representing them.

In KG.2 (average age 6.3) at least 16/32 (50%) appeared to have a concept of the island as a round or oval shape. Roads as definite linking features were only seen on 5 but might be inferred on about 26. Two of the five who could not relate the elements were near the top of the age group.

Primary 1 and 2 were appreciably different from the KG group, in spite of being in the same age range.* This suggests that chronological age is probably less important than the status of being at a higher school level, the stimulus of a more advanced curriculum and teachers' expectations. 20/27 (74%) in P.1, as opposed to 16/32 (50%) in KG.2 could see the island as self-contained, encircled by a boundary.

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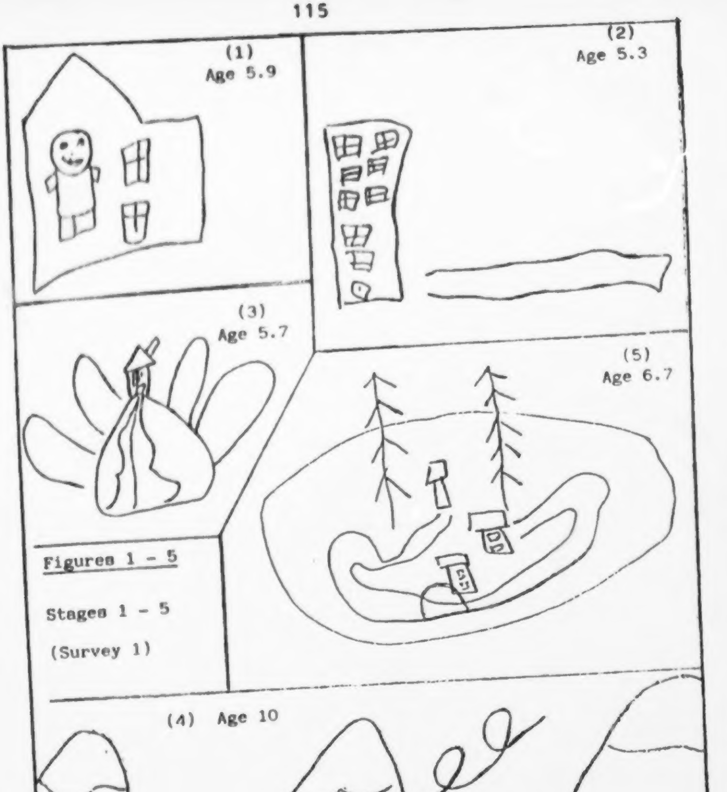
* The ages of the kindergarten children overlapped substantially with those in prima
1 and 2. The kindergarten catered for Chinese children who would go on to the Anglo
Chinese system where they start primary school at 6+. The children in the Prima
school were mainly expatriate and started at 5+.



(1) Age 5.9

(2) Age 5.3

(3) Age 5.7

(5) Age 6.7

Figures 1 - 5

Stages 1 - 5

(Survey 1)

(4) Age 10

Figure 6

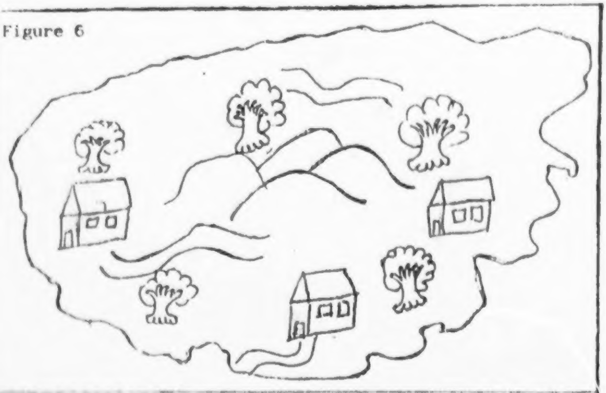


Figure 7

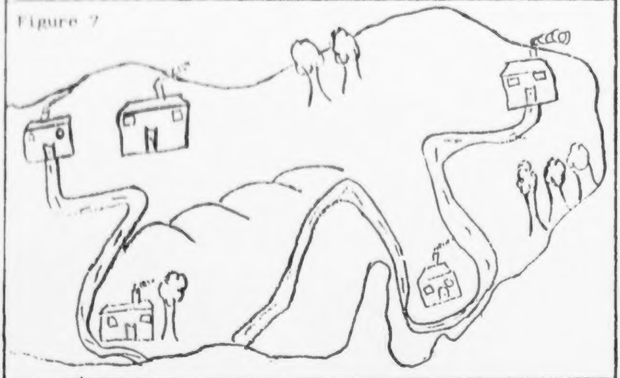
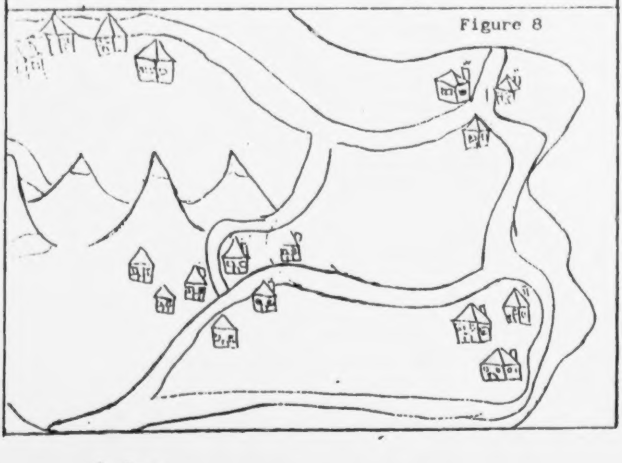


Figure 8



P.2 (average age 6.9) obviously had recently read some science/adventure fiction and were more concerned to represent flying machines, dinosaurs, and volcanic eruptions than islands etc. Drawings were complex, but four still seemed to be in the accretionary stage, representing the island/mountain as an inverted U with all buildings perched on the outline.

Although at least 21/31 (67%) of P.3 (average age 7.8) appeared to have the concept of an island, they did not seem to have made substantial advance in the conceptual quality of their drawing. Some appreciation of depth was thought to be seen in two drawings. Throughout the whole of the primary school, there was almost no understanding that houses further from the artist would become smaller. This stage was characterized by intellectual realism and corresponds with Piaget's projective stage.

A considerable advance was noted in P.4, (average age 8.8), when only two failed to indicate an island. Nevertheless, they could undoubtedly have verbalized an understanding of island. Most drawings showed a clear pattern of roads as links. The first drawing of buildings in perspective appeared at the age of 8 years 0 months (from the youngest in the class) but only three gave any clear indication of depth. Many experienced problems in putting roads or mountains behind houses and each item had to have its own separate space. The elements were separated vertically and 'stacked' on each other. The concept of occlusion seems to develop quite late. It seemed that relatively few, had yet reached the stage of linear perspective and 'visual realism.' Cox (1986:114) found that children over 8 could represent partial occlusion, but they were being asked to draw what they could see, and not to reproduce mental images, in many respects a more complicated operation. The change to the schematic stage, taking place from about 8 to 9 years, is in accord with Piaget and Cox.

Even though P.5 (average age 9.7) showed a considerable advance made by some students, several still placed houses at right angles to roads or paths. Although most found little difficulty in placing mountains one behind the other, and sometimes houses were also placed in front of mountains, roads had to be drawn clear. Everything had its own space, although the number retaining vertical separation of the elements on the island had decreased to about six. It is interesting that at this stage two drew maps with contours, one with a N-S-E-W sign. One used contours correctly and one indicated that contours represented height, but drew an incorrect pattern.

In P.6, (average age 10.9), there were four drawings of considerable artistic merit, showing an oblique, three-dimensional view of an island, with roads passing behind the mountains. Almost certainly, when these - and many of the secondary students also - drew 'pictures' rather than maps, and were classified as being in stage 4, they drew a picture from choice. Many revealed considerable maturity in their understanding of a landscape. All except two of the class showed a projective viewpoint, achieved by only about one third of P.5.

There was a marked difference in maturity between primary and secondary students - comparable with the change from kindergarten to primary. In S.1 (average age 11.10), two classes were included

Chart 1. Analysis of how children's representation of concepts changes

Stage / Class	1	2	3	4	5	6	7	8	9	10	11	12	Age range (yrs-mths)	Total
KG. 1	4	2	8	5	3								4.9 - 5.9	22
2		5	9	4	14								5.10 - 6.9	32
Pri.1			2	5	4	2	8	6					5.6 - 6.0	27
2			4	12	2		10	3					6.6 - 7.0	31
3			2	14	7		6	2					7.0 - 8.3	31
4			1	1			14	5	4				8.0 - 9.4	25
5				3	2		19	5	2		1	1	9.0 - 10.2	33
6				1	1	4	3	7		8	1	1	10.5 - 12.0	26
Sec.1a							5	16	2	5	4	4	11.4 - 13.5	36
b						6	4			3	13	7	11.7 - 12.6	33
2				1	2		6	6	X	2	7	9	12.6 - 14.0	33
3				2	1		2	9	X	4	4	13	13.7 - 15.8	35
4				1		2	6	2	X	0	3	10	14.7 - 16.3	24

Criteria used in classification

1. Only one element represented
2. More than one element shown, but separated
3. Elements added to each other ('accretionary')
4. Up to three elements exist, but not always integrated. Realistic picture drawn - horizontal view. Island has a mountain shape: presumed to be conceptualized (some sea or fishes drawn)
5. Island a clearly defined circle. Elements may be unconnected, roads may/not be links.
6. Picture effect of island with sea - oblique view
7. All elements included, not always integrated. Roads usually associated with houses but are not networks
8. Roads form networks - picture appears 'organized'
9. Ideas of perspective of buildings appear. Later dropped from chart as ideas of mapping prevail
10. Appears like a map - some oblique, some overhead views. Names added, occasional symbols. A very 'mixed' stage.
11. Contours appear, often not understood or added to picture map. Some symbols. Hachuring also used. Some 3D, some 2D
12. Representation entirely 2-D. Symbols, contours

- one (1b) having been taught contours, the other (1a) not. In S.1a the majority were clearly envisaging their work as a pictorial map. Roads disappeared behind mountains and reappeared logically. A key to signs was drawn on three maps, a scale was drawn, or stated, on five and a compass sign on three. In S.1b considerable imagination was shown in the naming of bays and mountains. Nine drew a key to signs, ten drew compass signs and four gave a scale. Although 20 (61%) showed relief by some form of contours, only seven (21%) were completely correct, and used all symbols as for maps. The others showed by inaccurate drainage patterns that they lacked comprehension of contours, or they included three-dimensional picture drawings.

S.2 (average age 13.2) showed no conceptual advance on the previous year, but S.3 (average age 14.8) showed that 13/35 (37%) had understood, and could reproduce, contours correctly and drew

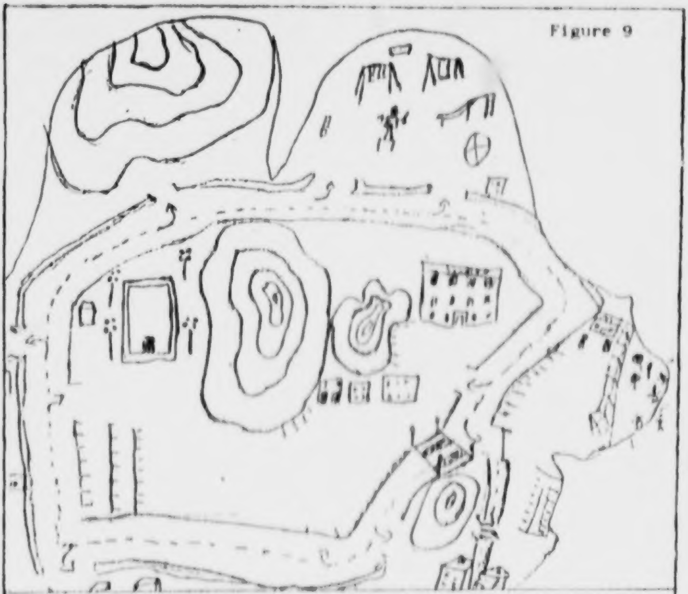


Figure 9

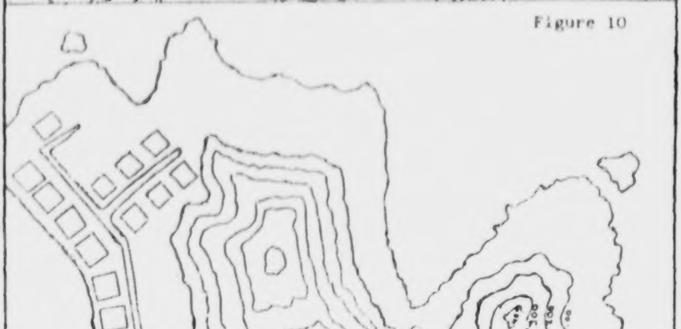


Figure 10

two-dimensional maps. Some used hachures or solid colour to indicate high land. Although 10/24 (41%) in S.4 (average age 15.5) understood contours and used them correctly, the execution of many maps left a good deal to be desired. They undoubtedly felt they were being asked to do something rather childish. The lack of accuracy in reproducing contours suggests that they could with advantage be taught later in the school career to enable complete understanding. The survey suggested a considerable advance at about age 14.

SURVEY 2

In the second survey the PGCE students (all in-service teachers), were asked to arrange for at least one class of Secondary Form 1, 2 or 3, to make drawings according to instructions they were given. A total of 2 249 drawings were collected, 1 250 from Forms 1-3. 31 schools and 59 classes took part.

Until recently, in Hong Kong, there has been relatively little appreciation of pupils' learning difficulties in relation to age and stage, or of a teachers' pastoral responsibility. Classes average 40, and recognition of individual differences and resulting problems is often difficult. One aim of the survey was to encourage the PGCE teachers to be more aware of their pupils as individuals, at different stages of development and of varying abilities, and possibly to assist them to identify and help individuals with perceptual problems. The exercise proved to be thought-provoking and useful for the students. Some were sufficiently interested also to run the survey in higher classes. It was also hoped to get an impression of the proportion of students in Forms 1-3 who might be deemed to be in a stage of formal operations.

The guidelines given to the teachers included:

> 'Try not to use words that suggest map or picture. If anyone asks whether
> should be a map repeat "Just draw what you think you would see" or if pres
> further, say "Whichever you think is better/more suitable ...it doesn't matter."

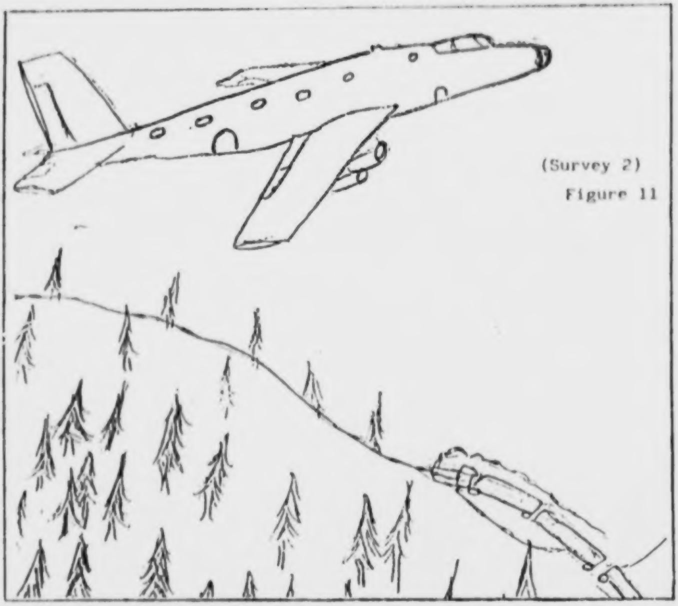
The instructions to pupils were:

> 'Draw what you would see if you were flying in an aeroplane above a forest.
> forest has a railway track and a train on the track. There may be some houses
> the forest.'

(A Chinese translation was given on the sheet to ensure that everyone had the
instructions.
It is thought that a similar survey has been done, using the same wording, but
original has not been located. Apologies and acknowledgements are hereby made.)

Criteria for arranging drawings

Two assumptions were made concerning the interpretation of the instructions, the first being that anyone in an aeroplane would obviously not be able to see the whole machine, although some of the wing might be in view. The second assumption was that if 'above the forest' was stated, the altitude would be too high for things to be seen in three dimensions.



(Survey 2)

Figure 11

Figure 12

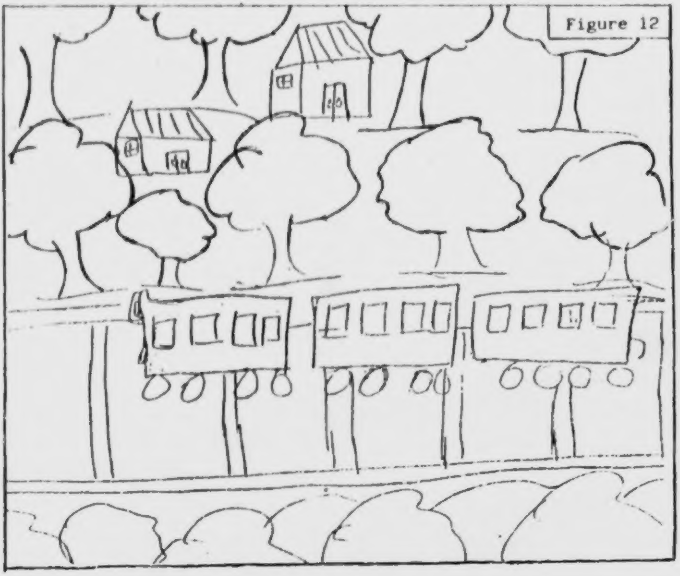


Figure 13

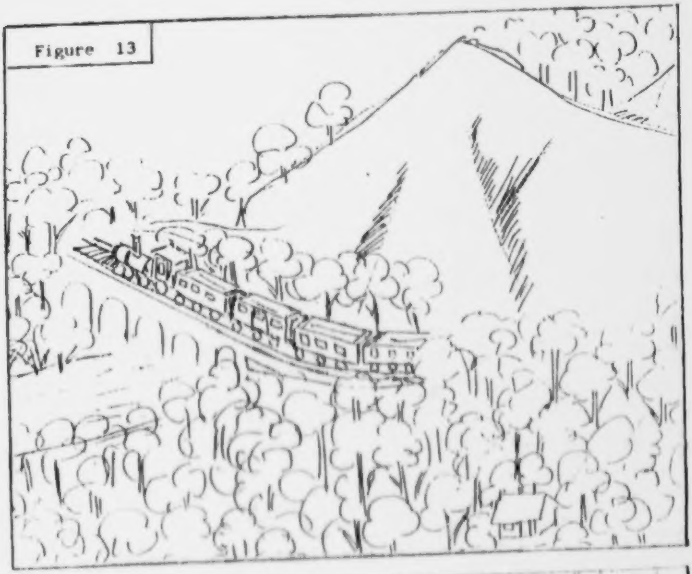
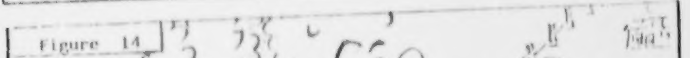


Figure 14



Five types of representation were seen in the drawings. They are thought to suggest a general level of development but should not be thought of too rigidly as developmental stages. In the first stage, Figure 11, the pupils drew a complete aeroplane, flying above the scene, and in the second, Figure 12, the drawing was as if seen from ground level. It was thought that these two types illustrated the inability of some pupils to imagine leaving the ground or even being in an aeroplane, and perhaps suggested slower conceptual development.

In stage 3, an oblique view of the scene is represented, varying from low to high altitude view, Figure 13. This is quite acceptable as a possible understanding of being in an aeroplane, but not really translating the instruction of being 'above a forest'. Some of those presenting this view were undoubtedly just enjoying drawing but it is suggested that many could still be in the concrete operational stage.

A wide variety of techniques were grouped together in stage 4. These included low oblique views (making a high angle with the ground) and views in which the artist was vertically above part of the drawing, (usually the the bottom, or centre) seeing some items in two dimensions and some in three, Figure 14. Some tried to portray the entire view in two dimensions but slipped into a three dimensional view of certain items, particularly houses and animals. This stage showed certain conflicts between what their experience told them they could see and between the hypothetical views they had begun to understand were possible - or they had learnt to draw in map lessons. Stage 5 comprised drawings that reduced all features to two dimensions, making a map, Figure 15. Using the argument from an earlier paragraph, it is suggested that anyone drawing a completely flat view and most drawing a 'mixed view' (stage 4) are conceptually advanced, probably in Piaget's formal operational stage. Many at stage 3 may also be.

Chart 2. Summary of secondary students' drawings

(Figures are percentages of total at each level)

Stages / Form	1	2	3	4	5	Total nos	Age group
I	4	16	24	34	22	580	12-13
II	1	10	20	37	32	561	13-14
III	2	14	30	30	24	679	15-16
IV	0	2	28	27	43	250	16-17
V	0	1	67	18	12	33	16-18
VI	0	2	18	27	53	102	17-19
VII	2	0	32	30	36	44	18-20

Possibly concrete operational

Transitional

Possibly formal operational

If the above assumptions about conceptual growth in relation to the drawings were true, it was expected that slightly more than half the Form 1 pupils (average age 12+) would show the techniques typical of stages 4 and 5. The figure was in fact 54%. If those in stage 3 who drew as if from a very high altitude, are added, approximately two-thirds of the group could be included.

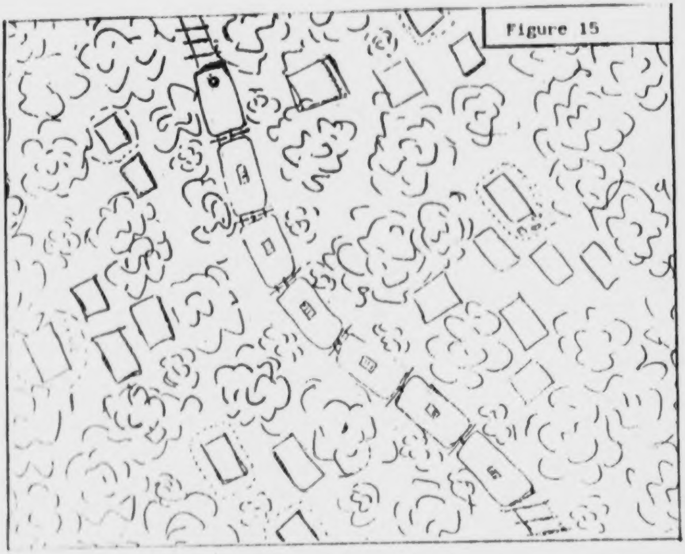


Figure 15

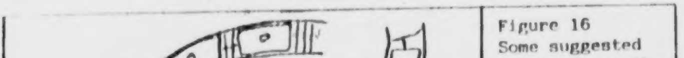


Figure 16
Some suggested
solutions to the
problems of bends

The chart summary does in fact suggest a figure of 68%. It was expected that at succeeding levels in the school, the numbers in stages 4 and 5 would increase, but in Forms 3, 5 and 7, which are all examination classes, there was a very large number in stage 3. One school that submitted a complete set of drawings from I-VI showed exactly the same trends as the whole group. (The figures for Form 5 have to be treated with extreme caution as they were only for one class of 33 students and similarly Form 7 was for two classes only.)

Comments on the drawings

The first feature to be changed from a three-dimensional representation was the train. Even in stage 3, some trains were drawn in two dimensions, although the drawing was from a very low altitude. All but two of the drawings classified in stage 4 represented the train in two dimensions. Many pupils found problems in taking the train round a bend if they had drawn a sharply curved track. They solved it by curving the side edges of the carriages or by angling the front and back of the carriages. Some of the bends were truly not negotiable by any train and showed a remarkable lack of comprehension.

The next feature to be represented as flat was the forest. The most difficult feature for pupils to represent in two dimensions proved to be the houses. This caused many drawings that might have been put into stage 5 to be placed in stage 4. Again, it was very interesting that the majority of houses had plumes of smoke from them, and also that the train had smoke. Diesel or electric trains have been used in Hong Kong for at least 15 years. Many trains had 'cowcatchers' suggesting American influence.

Young children are only able to produce one type of drawing, but as they get older they are faced with choice - between pictures, pictorial representations, or maps. The fact that they do not draw a map, an abstract representation, must not be taken as proof that they could not. Probably both surveys gave the impression of a slightly lower general level of conceptual achievement than was actually the case. The words picture or map were not included in the instructions of either survey and some of the older children undoubtedly selected a mode of expression less 'advanced' than they might have done with more specific instructions.

The findings of the two surveys could have serious implications for the teaching of mapping skills in junior secondary school. The results of Form 3, at the age of 15+ suggest that analysis of a similar group, both in Hong Kong again and elsewhere, would be valuable.

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THINKING SKILLS, GEOGRAPHY AND THE NEW MYTHOS

Paul F. Thomas

> If you can think and not make thoughts your aim...
> Yours is the Earth and everything that's in it...
>
> \- Rudyard Kipling

ABSTRACT

This paper examines recent North American proposals for developing "thinking skills" in the classroom and considers their implications for geography/social studies education with examples drawn from the Canadian context. Geography would appear not to have any unique role to play in the "generic" thinking skills agenda conceptualized by non-geographers who have claimed ownership of the terrain. Geography's critical knowledge, however, is indispensable in itself as well as for supporting the development of critical thinking skills which ought not to operate in vacuo. Applications and survival suggestions for geography are also indicated.

INTRODUCTION

The current North-American love-affair with thinking skills in education is on the verge of becoming a major academic growth industry. This trend has serious implications for geography-education for the following reasons:

a) non-geographers, particularly psychologists of every persuasion, have been i) setting the agenda of discourse and ii) shaping en passant--unwittingly perhaps--the character of what is passing for geography in the schools.

b) the increasing emphasis on generic thinking skills is tending to detach thought from substance, with an ensuing erosion of the unique contribution that geography can make in helping students to make sense of their objective world and the geocultural/environmental forces that shape their destiny.

c) The fact that thinking skills are at present ill-defined and without sapiential, consensual validation does not deter educational administrators from mandating their implementation as the cornerstone of future curriculum undertakings.

d) Most seriously of all, critical thinking skills have become blurred in the melange of "generic" thinking skills. The failure to recognize their pivotal importance precludes a fortiori, any operational concept of critical knowledge. The rationale for geography in the schools is also thereby depotentiated, inasmuch as the mere concern for generic thinking skills can be accomplished more effeciently without imposing the cognitive burdens of a discipline that purports

> to synthesize data from disparate sources into meaningful wholes that can bind cognition and affect in a way that compels conation, i.e., action.

That geography can handily support critical thinking is suggested by Appendix A which partially systematizes--for classroom consideration--a number of thinking fallacies which, although pragmatically useful, seem to have eluded the attention of the generic thinking-skills advocates.

THINKING SKILLS--THEMES AND VARIATIONS

1. Historic Context

The present enthusiasm for "thinking skills" on the part of the North American educational establishment is not a new one. It is but the resurgence of a passion dating back to Alfred Binet's "mental orthopaedics" of the early 1900's and John Dewey's program for promoting problem-solving in school children. Indeed it can be palpably demonstrated that many contemporary strategies for the teaching of thinking resurrect the proposals of Binet and Dewey (Brown in Chipman, Segal and Glaser, 1985, 319-338). This interest has legitimately surfaced since the mid 1980's in response to a) The so-called knowledge explosion; b) The computer revolution; c) The need for educational accountability, especially in recession-prone economies.

2. Legitimacy of Concern

Those who advocate the formal teaching of thinking skills draw upon John Goodlad's A Place Called School (1984, 229) which, on the basis of 1000 observational accounts, concludes that, since students are rarely required to do anything more complex than the recall of information, a lack of thinking prevails in most American classrooms. Despite challenges to Goodlad's research methodology, it is still a universal public perception that thinking in the schools ought to be, and can be improved. As for the knowledge explosion, it is a commonplace observation that bodies of knowledge are important but quickly become outdated. Thinking skills presumably never become outdated. The computer revolution is now an ontological given, that provides a means of coping with the knowledge explosion, via information-processing the dominant motif in the thinking-skills debate. That improved thinking will conduce to greater economic productivity is possibly a Type B fallacy (See Appendix A).

3. Conceptualization of Thinking Skills

a. Anarchy by consensus. Because of the diversity of academic enterprises claiming territorial rights, the literature of the current decade is of a highly proliferative and controversial character.

In practice terminological distinctions such as "reasoning", "critical thinking", "creative thinking", "problem-solving" and "decision-making" are lost upon, not only the lay public, but also upon teachers and administrators who see no operational utility in such distinctions. Some philosophers regard the pursuit of definitional consensus as misdirected because the social nature of language colours the way that meanings are semantically implanted in terms. On the other hand, it is all too easy for "thinking critically" or "problem-solving" to become vacuous slogans quite beyond translation into teaching methods and curriculum materials (Munby, 1982, 487).

b. *The mental versus the logical paradigm*. At the risk of some oversimplification, the quagmire of competing positions can be polarized into two competing paradigms, namely the mental and the logical.

> The *mental paradigm* holds that thoughts and mental processes, being invisible, can not be observed directly but only by their products (Feely, 1976, 6). Since the posing of different kinds of questions does, in practice, elicit correspondingly different types of response-products it is held that thinking skills can be *stimulated* by the judicious use of structured hierarchies of teacher-generated questions such as those provided by Bloom's taxonomy (Bloom, 1956; Feely 1976, 6; Beyer 1984). In other words one can have structured question input and structured response output without needing to know what is happening in the mind.
>
> The *logical paradigm* posits the possibility of analyzing and reducing mental processes to procedural elements for *informational processing*. Procedural elements are susceptible to sub-factoring into arborizing networks of nesting micro-elements so as to engender the systematic descriptions akin to those to be found in military training manuals.

Since one can think about thinking, or indulge in *metacognition*, knowing how to think is deemed to be a species of *procedural knowledge*. Supporters of the mental paradigm regard this procedural knowledge as discipline specific or context-bound (Sternberg 1985, 193-197). Supporters of the logical or information-processing paradigm argue with varying degrees of intensity that thinking skills are generic and transferable, providing that detailed process training is provided and attention given to life contexts (Robinson, 1985).

c. *A Trend in Canadian Geography/Social Studies Education*. As can be seen from Table 1., recent developments appear to favour the information-processing model of thinking skills. The parallelism between the four columns in that table is not due to similar fundamental structures being discovered by different research teams working

Table 1. FROM "GEOGRAPHIC THINKING SKILLS" TO INTERDISCIPLINARY INFORMATION-PROCESSING SKILLS[1]
(An Example of Inter-subject and Inter-regional Diffusion)

Geographic Thinking Skills - Augustine (1978)	Skill Statements appearing in Intermediate Geography Guideline being used in 1981, Province of Ontario.	Organizers for Problem Solving Skills - Robinson, Ross & White (1985), p. 108	Interdisciplinary Information-Processing Skills List - proposed by B.C. Ministry of Education (1987)
1. establishing a focus for the inquiry	"defining a task"	1. Establish a focus for the inquiry	1. Establishing a focus for the inquiry
2. establishing a framework for the inquiry	"organizing information in a logical pattern"	2. Develop a schema/framework for the focus	2. Establishing a framework
		3. Formulate a plan for filling the framework schema	
3. determining sources of data	"locating information"	4. Specify sources of data required by plan	3. Locating source of information
4. obtaining data at the source	"retrieving information" "deriving information through photographs, maps, diagrams, charts, graphs and sketches"	5. Locate sources of information 6. Determine meaning of data at source	4. Obtaining information at the source 5. Decoding information at the source
5. assessing the adequacy of data	"evaluating information" "judgment in recognizing what information is applicable in a situation"	7. Determine adequacy of data at source	6. Assessing the adequacy of information
6. putting data in the frame	"recording information" "translating geographic information from one form to another" "preparing displays to present information"	8. Put data in the framework/schema	7. Recording information in the framework
7. reducing data to summary form	"interpreting information"	9. Use a data summarizing algorithm	8. Summarizing information in the framework
8. observing relationships	"interpreting patterns and seeking relationships"	10. Observe relationships in data	9. Observing relationships in summary data
9. interpreting relationships	"interpreting information" "interpreting patterns"	11. Interpret meaning of observed product	10. Interpreting the observed relationship
		12. Evaluate the product	
10. extrapolating the interpretation	"reaching tentative conclusions or generalizations"	13. Extrapolate meaning of observed product	11. Extrapolating the interpretation beyond the problem framework
		14. Determine implications of product	
11. communicating an inquiry	"communicating with others" "presenting information succinctly"	15. Translate frame-filling process and/or product into a public representation to suit specific audiences	12. Communication of the inquiry and its result

[1] Source: Composite compilation after sources indicated in column headings.

independently of one another; but rather due to *diffusion*, as educational administrators and curriculum planners quite often find it easier to appropriate rather than to rethink such matters. That these interdisciplinary skills originated in *geographic thinking skills* was forgotten by their final borrowers (see Table 1) so that at present the B.C. Ministry of Education does not perceive geography in the schools as having any significant potential for fostering thinking skills.

CRITICAL ISSUES FOR GEOGRAPHY EDUCATION

1. Hyper-rationalization and the Decline of Holism

The information-processing model of thinking skills is rooted in the computer metaphor. Inasmuch as the computer revolution implies future access to enormous quantities of information (irrespective of its *quality*) the business of imparting *skills for the management of information* is becoming the educational imperative of the day. By the same token the need to justify the cost of computers in the classrooms is shaping what shall be taught and how it is to be taught. Because of the ease of reading and storing statistical and formatted information by computers, the matrix-approach to thinking skills, such as Robinson's (1985) is being expropriated holus-bolus without regard for his qualifying specifications for handling content-imbedded matters. The adoption of a "generic" interdisciplinary skills approach is a "quick fix" that places no cognitive demands on the authorities and, in many instances, has eliminated the need for geography consultants.

Computers, however, occlude the value aspects of information to a greater extent than occurs with print media. The disinclination to ask, "What is worth formatting?" plays into the hands of software entrepreneurs who are rarely subject specialists. Absurd "geography" simulations often result such as that of the solo voyageur (early Canadian explorer) travelling with 20 tons (!!) of pemmican (preserved meat) with which to purchase a warehouse of exotic products from 15 Indian bands scattered in improbable locations. Means are thus being confused with ends, i.e., information-processing for its own sake. Propositional language can never capture the realities of life or of the classroom. No set of logical matrices defined by non-geographers, can of themselves capture the quality of place that is the touchstone of the cultural geographer's *holistic* concern for human-environmental interaction.

2. Critical Thinking Skills (C.T.S.)

a. The demise of C.T.S. As Fitzgibbon (1988) has pointed out, the adoption of computers by schools represents unplanned, but successful change whilst the incorporation of thinking skills in the curricula has been planned but unsuccessful change. Ontario, the national leader in curriculum development admits to having abysmally failed to develop self-directed problem-solvers (Puk, 1986).

In the area of critical thinking skills, which is considerably more complex, the situation is a fortiori even more dismal--expecially in view of the lack of consensus, indicated earlier, as to the meaning of critical thinking. Beyer's list of "Key Critical Thinking Skills (1985, 76) is currently being promoted by British Columbia. Its 10 items are as follows:

i) Distinguishing between verifiable facts and value claims.
ii) Determining the reliability of a claim or source.
iii) Determining the accuracy of a statement.
iv) Distinguishing between warranted and unwarranted claims.
v) Distinguishing relevant from irrelevant information, claims, or reasons.
vi) Detecting bias.
vii) Identifying unstated and stated assumptions.
viii) Identifying ambiguous or equivocal claims or arguments.
ix) Recognizing logical inconsistencies in a line of reasoning.
x) Determining the strength of an argument.

There are as yet, however, no Canadian geography or social studies curricula that give any inkling as to how to operationalize any critical thinking schemas, most of which are remarkably unremarkable in their grasp of what good geographers are actually able to do in their classrooms. According to Fitzgibbon (1988) critical thinking will continue to be rhetorically supported as a goal, but abandoned in practice. This is due to a number of reasons:

a) Few teachers are capable enought critical thinkers themselves to teach C.T.S. to others.

b) Teachers who make the sincere attempt often find their "authority" challenged on principle rather than by quality of counter-argument.

c) Genuine C.T.S. would threaten vested educational, political and economic interests (Postman 1984).

d) Real life problems have different characteristics from textbook examples and classroom examples. They tend to be inbedded in multiple contexts; may require experiential knowledge; solution criteria are not clear; consequences of choice really matter; contexts may be murky and the problems complicated, persistent and occurring in groups (Sternberg, 1985).

b. Via negativa - a partial resitution. It is a commonplace observation in scientific methodology, that it is much easier to disprove, than to prove, a proposition. Similarly it may be more expeditious to regard C.T.S. as a means for spotting errors in thought and discourse (de Bono, 1983, 703-708). De Bono believes that thinking can be taught independently of content. However, virtually no one believes that any generic thinking methodology would suffer as a result of being applied to a body of content. Appendix A. gives a checklist of common fallacies of distortion for students to be mindful of, while at the same time giving some examples of applications to geographic discourse. This simple approach, although partial and only one of many that could be used, is not to be found in any geography/social studies curriculum known to this writer.

3. Critical Knowledge and Geography

In a number of Canadian and American jurisdictions, commercial publishers are now commissioned to produce geography/social-studies texts that adhere to prescribed and constricted "thinking skills formulas". As a result, "vapid writing ... a mere tidbit, a word a phrase or a heading is used to substantiate coverage" (Tyson-Berstein and Woodward, 1986, 41-45).

The obsession with information processing can not, in itself, ensure that worthwhile substance will be processed. We live in a "glut of information, 90% of which is garbage" (Suzuki, 1988).

Worthwhile geography content can "kill two birds with one stone", i.e., provide critical knowledge (indispensable knowledge for coping with a world in crisis) as well as engendering desirable thought processes.

It was precisely the promise of critically significant knowledge that fuelled the expansion of North American geography-education after World War II. But the vision of Isaiah Bowman (1924), Fairgrieve (1942), Griffiths Taylor, Pinchemel (1982) and others appears to have been lost as geography and geography-education are being eliminated from North American institutes of higher learning (Reagan, 1987).

CONCLUSIONS

1. Challenge and Opportunity

The diverse and often recondite conceptions of geography currently held by its practitioners and their inability to communicate a consensually held and intelligible mission for geography-education to educational policy makers is having serious consequences in North America. Non-geographers--by default--are determining geography/social studies curricula. Psychologists are defining "geographic thinking skills" which are now being denigraded to mere pre-geographic questions such as: "Where is Vladivostok?"

Nevertheless there do exist well-informed lay-persons who understand that without certain kinds of critical knowledge that geography has to offer, the world would be overwhelming in its mystery.

> "Diplomats [would] blunder, bankers make bad loans to countries that don't have the resources to pay them back, oil containers get placed upriver from millions of homes and children grow up bigoted. [Even so] the world is a mystery to too many people. [especially if one considers that] 95 percent of the incoming freshmen at a Midwestern [American] college are not able to place Vietnam on a map" (Gilbert M. Grovesnor, President of National Geographic Society as quoted by Foster, 1988).

The over-riding purpose of education, is to develop persons who will be subjects and not objects of history--in other words persons who can--among other things--shape the geonomic, political, social and environmental forces that impinge on their lives rather than be blindly buffeted by them.

2. Towards a New Mythos

A myth is but a fable, but a Myth is a redeeming value. Educational decision-makers think mythically when they appropriate promise-intensive ideas without the rigorous attention to operational details required for their realization. Geography by its nature can easily accommodate any information-processing schema for facilitating thinking skills. As a science of documentation concerned with correlating and grounding nesting tiers of generalizations to earth-plane "thing-ma-bobs" or referents (see Appendix A.) it also serves very well, but without self-advertisement, the cause of critical thinking skills. Geography also offers critical knowledge

But these attributes do not deplete the inexhaustible treasures of the discipline, nor do they speak to its transcendent iconic riches. More than mental mapping is meant here. The high-level generalizations of geography because of the integrative character of the discipline can also be regarded as gestalt configurations which reconcile nature and culture, quantity and quality, the nomothetic and ideographic, matter and mythos, the left and right cerebral hemispheres, measure and meaning. These configurations can also be conceived of as holons or members of open-ended hierarchies of meaning. If a picture is worth 1000 words, master-images are worth 100,000 words; for they stand at the apex of an hierarchy of generalizations that compress a universe of meaning. Geography must necessarily inform the higher-order images that reconcile man and his world as a co-constituted unity. Not only do such images compress considerable information. They compress considerable affective energy as well and so have tremendous power in shaping human values and actions (Thomas 1978). Information-processing models of thinking serve only the left cerebral hemisphere. The next generation of computers may facilitate easier image banking and manipulation so as to exercise both cerebral hemispheres in a balanced way. But this will only happen when geographic holism is restored to its pristine mythopoeic function, to once again become our lode star.

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Appendix A. FALLACIES OF DISTORTION FOR CRITICAL EXAMINATION IN THE GEOGRAPHY CLASSROOM

Critical Thinking Concept/Issue	Synonym/Meaning(s)	Geography/Social Studies Examples	Comments
A. Classical Fallacies of Distortion			
1. Ignoratio Elenchi	- missing the point, - straw man, - barking up the wrong tree, - red herring, - tu quoque (you too).	The issue of whether or not the Russians have any business to have a military presence in Afghanistan is not addressed by pointing to American military involvement in Central America.	It is common practice of partisan politicians in Western-style democracies to respond to criticisms of their policies by counter-charges, rather than dealing with the criticisms factually.
2. Argumentum ad			
a) hominem	- disqualifying one's right to argue by an attack on the person. - label and destroy (semanticide).	Opponents of agricultural collectivization in the USSR in the 1930's were dubbed "class enemies".	Have students collect examples of label and destroy tactics from - public environmental issue debates - the historical geography of recent wars
b) verecundiam	- appeal to authority, usually based on feelings of veneration.	"Biblical" authority was used to justify (sanctify) Boer land claims in South Africa.	Types of authority can be: - political, - moral, - physical, - literary (eg. "number of citations"), - sapiential, Which are likely to provide the most valid? The least valid sources of truth?
c) baculum	- appeal to fear of dire consequences. - "Do this or else."	Stalin's reign of terror (a form of physical authority). "We must not press for anti-pollution measures because industries--in the face of rising costs--will move out and there will be massive unemployment."	
d) personam	- appeal to personal self-interest.	"The election of certain politicians will ensure continuing grain subsidies to wheat growers."	Should society, economics and politics be structured for the "common good" or to accommodate competing selfish interests with a minimum of state interference? Is this the real basis of East-West rivalry and for the divison of the world into armed camps? What light can economic, political and world regional geography shed on the problem?
e) populum	- appeal to popular prejudice/Bandwagon - "Everyone's doing it."	"If we don't sell armaments to Pomerania, someone else will."	
f) misericordiam	- special pleading on basis of "pity".	Certain "free-enterprise" industrial corporations want government "off their backs", but may be the first to cry for help in times of difficulty.	Corporations thus requesting government aid have been dubbed "corporate welfare bums" by their opponents. (An instance of semanticide?)
g) ignorantiam	- ignorance of consequences is taken to be a positive proof of what is claimed to be good or true.	If disarming two rival nations A and B is likely to yield peace it does not logically follow that not disarming A and B will lead to war. (Compare with the simpler syllogism: "Whenever it rains the field is muddy" does not imply converse: "Whenever it does not rain, the field is not muddy".	This is one of the most pernicious of fallacies since denial of antecedent does not logically imply denial of a consequent. Thus: If P then Q does not mean if not P then not Q. In the case of the example given, however, a deductive fallacy may in fact be contradicted empirically.

3. Petitio principii	- begging the question	"Is the Aryan race superior to the Jewish race?"	"Aryan" is a linguistic term; "Jewish" is a cultural term. Neither is a racial term. Linguistically, Jewish (semitic/Yiddish) already belongs to the Aryan family of languages. Nevertheless contrary notions led to genocide of a people (a demographic and therefore a geographic phenomenon).
B. Moral fallacy			
1. "Ought to be" = "is"	- Assuming that a purely imaginary ideal actually exists; so that it becomes "improper" to inveigh against "motherhood". - "the grass is greener on the other side of of the fence".	Utopia does not exist here (wherever one happens to be) because we usually have some data about the imperfections of here and now. But as an archetypal unconscious idea, utopia can become projected upon a there or then about which we have very scanty data (or data that we refuse to look at). Eg. Stalin's Russia of the 1930's was regarded with religious fervour in the West as a workers' paradise despite reports of mass purges and genocidal famines.	In terms of practical consequences this may be the most pernicious of the fallacies. Heaven help the person who challenges a spurious notion of utopia for which countless numbers of persons may lose their very lives.
C. Semantics Principles (bearing upon critical thinking)			
1. Abstraction (I)	- Increasing the distance between a concept and its roots (referent) in the real world	"Who has a clearer idea of wheat ... the farmer who grows it, or the broker on the stock-exchange who buys and sells it by carloads (that he has never seen)?"	To what extent is the stock-market crash of October 1987 a problem of unrealistic abstraction?
2. Abstraction (II) (Blind men and elephant principle)	- By abstraction in this sense is meant the process of selection. Every person is selective in what he or she perceives. The selections of no two persons, from a a complex entity of many attributes, are every quite identical.	Fishermen, foresters, oil prospectors, dairy farmers, steel makers and so forth all have different perceptions as to what a nation's priorities for economic development can be. This truism can be readily experientially demonstrated by classroom simulation games.	Each set of abstractions is related in some characterological way to the person making them. The characteristics and limitations of human perception must be taken into account as well as "logic".
3. Nominalist fallacy	- assuming that there is an actual referent* for a term that has been used. * Referent is that which a term represents or stands for such as: a) a "thing-ma-bob", i.e., something tangible or concrete. b) an operation by which a concept can be grounded in reality. A semantic blank (or blab) is the absence of a referent.	"Free trade will promote national unity". (In the absence of operational contents this translates as "blab will blab".)	Using a semantic blank, or abstraction, having no referent or grounding in reality is a very serious problem in political discourse. Geography as the science of documentation—i.e. of grounding perceptions about the world to earth-plane thing-ma-bobs—provides a useful antidote.
4. Multi-value judgment	- mistaking an aspect of something for its essential nature or failing to realize that entities may have qualities which seem to be contradictory.	"Are the Japanese (or any other group) basically co-operative or competitive?" "Consumers are more important than producers."	Co-operation and competition are both aspects of "human nature". We are both producers and consumers.
5. Personification	- treating abstractions as things. - mistaking relatives for things or qualities.	"When economic justice triumphs, our national honour will be restored."	Justice can not triumph. It is not a person. People kill one another over such semantic blanks as "national honour", "King and country" and so forth.

6. Many questions	- posing as a simple question requiring a simple answer so as to mask the sub-categories of the issue.	The question: "Is the Pomeranian famine the result of sin?", masks possible multiple factors such as drought, political corruption, guerrilla warfare etcetera.	This type of distortion is most effective when combined with blabbery (semantic blanks).
7. Non-allness	- nobody knows everything about a complex situation; nor can everything about it be fully communicated.	"Our all-wise leader has been chosen by the will of God to expel foreign technology and modern industrial development from Pomerania".	
8. Process principle	- process can be mistaken for substance.	Sequent occupance provides a useful time-perspective for understanding the evolution of a cultural landscape.	Physicists tell us that matter is a process and that our senses give us a very distorted view of the world.
9. Glittering generality	- an inductive error of overgeneralizing from too few particulars.	"Los Angeles must have a wet climate because it was raining the day I was there."	Simple qualitative regional generalizations have ikonic utility in geography for young teen-agers, as when one speaks of "the Hot-Wet Tropics" on the basis of data from selected climatic stations. One of the tasks of teaching is to reduce a maze of data to comprehensible form without losing sight of the original documentation.
10. Principal of degrees	- many things in the universe exist on a continuum and can not properly be described discretely.	Legends to thematic maps specify ranges of altitude, moisture, temperature and so forth. This helps to check the primitive tendency of students to speak of "high" mountains, "good" climates, "good" soils, etcetera.	Geography teachers tend to be very good at dealing with this problem, but need to be given more recognition by cognitive scientists for doing so.

Appendix B Notes:

1. A non-allness approach should be taken towards this table. It does not purport to be comprehensive. The applicational examples for the geography classroom are purely suggestive. Teacher-practitioners can readily devise suitable applications appropriate to their unique configurations of time, place, circumstance and pupil stage.

2. The table given stresses some common fallacies of distortion--often wilful. The listing in section A is classical in the most literal sense as it is largely based on Aristotle's De Sophisticis Elenchis. Contemporary educational theory and practice in North America, however, appears not yet to have caught up with the ancients.

3. Omitted from consideration are:

   i) fallacies of formal deductive reasoning;
   ii) fallacies of induction and observation.

   Deduction is not unique to geography; it is well-honed in mathematics education and amply treated in standard textbooks of logic. In the 19th century, deductive capacity was considered to be a "power of the soul" when it was thought that the newly discovered subconscious mind could only reason deductively. Capacity for deduction is related to native intelligence. The error of jumping to conclusions is that of thinking mechanistically (deductively) when carefull induction (looking at all of the evidence) is required.

   Observation is usually well-handled in science classes.

   Induction is (or ought to be) very well handled in geography the most synoptic of all disciplines taught in the schools.

A VISUAL IMAGE PROVIDES FOOD FOR THOUGHT

Dr. Henriëtte S. Verduin-Müller

ABSTRACT

Media conquer the world, but they will only play their role in geographic education and geographic information in the public domain, if they are understood. Understanding media demands much hard headwork next to study and research.
In this paper attention is given to the still visual image, the oldest, most important, however often badly used medium in geographic education and information.
The visual image is introduced along its characteristic features; image categories are distinguished; the informative and communicative functions of the visual image are high-lighted. Possible reasons for insufficient use of the visual image are given throughout the paper.

A VISUAL IMAGE PROVIDES FOOD FOR THOUGHT

INTRODUCTION

Of all (school)subjects there is no doubt that geography will be the one most suited for visualizing. Although the reasons are well-known and widely accepted by all involved persons: students, teachers, and inspectors, visualization of geographic content and its use is far from optimal.

In this paper we will focus on the visual image in function of geographic education. We had to limit ourselves to the most essential aspects, the reader, though, must not expect full coverage of the theme.

Moreover we will concentrate on the still image. Moving images such as film and video need a different approach. Nevertheless what will be said concerning the still image, equally counts for movement-based images.

Through the ages a visual image has been experienced as a source of knowledge. However, after the invention of the art of printing in the middle of the 15th century, the image as source of knowledge was gradually surpassed by the printed word. The visual image became the cosmetic make-up of the printed word, or to say it more friendly, the image became an illustration of the word. None the less, sometimes the illustration could be understood within its printed context a real support of the written text. During presentations however the visual image was and is still mentioned with a certain disdain, effected by a diminutive affix, and apart from its appearance, a 'picture'.

But things keep changing, rather recently the notion of the visual image as explicit source of knowledge is regaining.

The come-back has to do with the extension of the optical- and electronic media, and with the improvement of the quality and the easy dissemination of the visual image. To make full use of the new outlook on the visual image for information and communication for the benefit of education systematic orientation on the image will be needed. Education is meant here in a wide sense: formal education, further and adult education and the public domain.

Successively we will
- define, explain and reflect the concept visual image;
- name and explain, in order to express geographic content, the different categories of visual images;
- reflect the visual image as a means of information and communication in the educational and the public domain process.

DEFINING, EXPLAINING, REFLECTING THE CONCEPT VISUAL IMAGE

A visual image can be defined as a perceptible and selective representation of reality.

In explaining the definition's terms the following remarks are made.

- Perceptible must be taken literally, thus in the sense of able to be perceived. Consequently mental images are not included in the definition and cannot be because they develop out of scientific control. Forming images in the mind, building up knowledge is an affair of the human personally. However, the course of the process as influenced by education and information in the public domain might gain to a high degree by good, that means content-rich and transparent, visual images.

* The representation, the next term, means the state of being represented through one or another type of medium in the sense of material (paper, plastic, wood). Also the to-day's manifold electronic presentation facilities are seen as material.

* Reality is to be taken in the sense of the state of things, situations, processes etc. as they are or appear to be and not as one might wish them to be. Thus explicitly a more philosophical notion concerning reality in the meaning of existing things independent of human awareness is got out of order, because however interesting that may be, does not carry us any further.
We emphasize once again that we have to do with a representation of reality and not of reality itself. It might seem strange but this is often overlooked.

Definition and relating remarks concerning the visual image gives way now to two reflections of informative importance. Firstly, the visual image always is a cut-out of reality as taken by its designer and producer, is thus selective; Secondly, because reality is at stake, in a visual image always relations are to be perceived. Those relations being of an intra-and inter-character (intra: between objects and phenomena aspects themselves; inter: between the objects and/or phenomena mutually).

Unfortunately the intra-as well as the inter-relations within a visual image are often unsufficient or not at all 'seen'. Thus the human is missing worthwhile information. Let us remember that distinguishing, understanding and wording spatial mutual dependencies is pre-eminently in geographic education and public information. The very final goal being that the human can and dare venture independently to acquire insight into new spatial social relationships. The reasons for this ´not-seeing relations´ are twofold and coherent to a certain degree.

* Firstly is mentioned a deficiency of knowledge about the subject presented in the image. The human cannot put the relevant questions necessary for the interpretation of the visual image. And for that reason there will be lack of understanding. (Thus lack of knowledge of a polderlandscape prevents the full understanding of an airview of the Green Heart of the Randstad.)

* Secondly a human´s perception, the generation of information, conceptualization and storing of information in the natural memory (and in artifical memories, such as paper, computers) are in general sloppy, loose and superficial. Humans seem to be far less active and precize concerning brain activities, than was always thought. Research on the design of knowledge systems all over the world has clearly shown that the most crucial and difficult moment is the acquisition of knowledge from the expert. People seem not be aware of the way in which they acquire their knowledge. Designing knowledge systems is part of AI-research (AI: Artificial Intelligence).

Thus non-conception of the visual image has definitely an intellectual basis.
It will be clear that a stand is taken against the often heard idea that the glut of visual images in our daily life will lead to a negation of the visual image.
The renewed interest for the visual image as posed above might, apart from technological facilities, very well find its roots in an overall better educated human and on its turn lead to higher forms of knowledge.

NAMING AND EXPLAINING, IN ORDER TO EXPRESS GEOGRAPHIC CONTENT, THE DIFFERENT CATEGORIES OF VISUAL IMAGES

Given the definition of the visual image we can distinguish two categories:

* iconographic and * analogue

The iconographic category consists of two sub-categories:

* nature-alike images, having a high resemblance to reality however,not equal to reality. An image of the Mont Blanc, as well as an image of people shopping in a main street belong in this category, normally we refer to these images as pictures independent of the type of material. The likeness with reality may vary, view angle and colour being most determining.

* structure-alike images having some resemblance to reality as far as structure concerns, however never are equal to reality. An image of the outline of the City of London and a relief of the Ural Mountains belong in this category. In every day life we refer to these images respectively as plan or map and model. The likeness with reality can vary. The scale is determing for the degree of likeness, as well as the way the plan or map is produced.

In the analogue category, our second one, qualities and relations between immaterial phenomena are given in a spatial pattern, the content is read according to an analogon. In a climate diagram qualities of phenomena and by its grouping the relations between temperature, precipitation, and sunshine for a certain period and place are imagined in a spatial way.

A data-based network of services in La Défense, Paris, may be spatially organized in a graph, by which the diversity and the density become quite clear.

Thus in an analogue image we don´t see a ´Gestalt´, but an analogon of a phenomenon.

It was already the Fench philosopher, Bergson, (1859-1941) who posed that the human tend to imagine more or less complex issues in schemes, spatial patterns, in order to get grip on the phenomenon under consideration. And indeed this is the case in a so-called analogue image.

Being a representation of reality a visual image is human-made. This means that the maker has to be selective, and thus puts by definition a stamp on the work. We will not take up here a discussion about the design and production of a visual image. However, for the sake of good educational and informative function of a visual image we pose the wide breadth of the field between ´vision´ and ´manipulation´. In order to get a certain content the maker may not only choose an exceptional view angle or by graphic techniques may put an accent on important phenomena, but also could retouch objects or persons. The maker could disregard frontiers on a map, leave out net-work fragments or take as data whole images or segments to construct a fully fictiteous visual image (as so easily is to be done by modern computer technology).

The line between vision and manipulation is not always so clear and could even be subject of sincere discussion. It is obvious however that in the case of demonstrable manipulation a viusal image as a representation of reality will not be accepted. We don´t have to do with a visual image according to the definition given.

But let us be honest, concerning the ´word´ as means of expression we have exactly the same phenomenon. Still the situation verbal-visual is not wholly comparable, because in the case of visual images the credibility as such is rather high and to a certain degree this also counts for the word in print. We stated already that unfortunately visual images often are seen as reality itself. Summarizing can be posed that the human who will use the visual image and it might be the educator or the user in the public domain must at least reflect on its reliability.

THE VISUAL IMAGE AS MEANS OF INFORMATION AND COMMUNICATION IN THE EDUCATIONAL AND THE PUBLIC DOMAIN INFORMING PROCESS

The use of the visual image has two basic aspects: an informational and a communicative one. Attention will be paid to both aspects the one after the other.

The information aspect. A visual image serving geographic education informs about the subject in question. Central is here the intrinsic cognitive value of the image and its contribution to the realization of the objectives of geographic education and public information.
Regarding the information aspect of the visual image we pose that it is an indispensable tool in geographic education and public enlightenment. This is to be concluded from the theory concerning the visual image as put in the preceeding sections of this paper:

* in a visual image relations (intra and inter) are made observable by simultaneous presentation;
* the visual image directs the forming of cognitive patterns by the image-inherent selectivity of the content;
* a visual image, owing to its exact appearance, convinces the viewer of the essence of objects and phenomena;
* thanks to the perception realized via the visual image a more exact exchange of views is possible.

However, the observations and perceptions as such and the informative benefit will not occur unless the learning human is interested or knows where to look for. Only then the processing of the image´s content get a chance to take place. In actual teaching and learning there are many possibilities to stimulate processing activities, so as by discussing and analyzing (eventually together with projection on a ´black´board) the geographic content and to fit the acquired knowledge into other subject matter. To promote continuing education and public information at large the visual image could be provided and explained by necessary notes.

The communication aspect. The communication situation during educational and informative work should be of high quality and must be most carefully proceed. Both parties should experience the situation as reliable, open and relaxed. Fortunately next to the information aspects the visual image also have attending communicative phenomena of a positive character. Below the experienced aspects will be systematically summed up:

- visual images form a collective and objective starting point in teaching/learning and informing situations;
- visual images fascinate, so that the student feel actively involved;
- visual images excite interest, help to concentrate the attention;
- the use of visual images causes an apparant relaxation;
- the use of visual images brings variety in the methods of teaching and informing;
- the use of visual images inspires confidence;
- the critical use of visual images introduces a critical attitude to images in general.

It might very well be that one of the most fundamental advantages of using visual images will be the fact that the tension, necessarily inherent to every information-based communication situation, is deflected and objectified temporarily. In the list given this leading advantage is split up into several categories.

CONCLUSION

That a visual image provides food for thought can be derived from the described qualities of the visual image. Because geographic education and enlightenment have principally to do with the promotion of thinking and understanding of mutually spatial dependencies, the visual image is an essential tool for those involved in teaching and informing geographic knowledge.
Moreover the good use of the visual image will positively influence the communication process.

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TEXTBOOK FACILITIES FOR DEVELOPING LEARNERS' SKILLS AND ABILITIES IN GEOGRAPHY

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ABSTRACT

New geography curricula in the Federal Republic of Germany call for a return to regional geography in schools. There is great concern that this means going back to students memorizing a large bulk of single facts, too, and that more demanding classroom activities cannot be retained. By distinguishing five categories of classroom work the paper shows that regionally organized textbooks tend to suggest more reproductive assignments than thematically organized textbooks do.

AIM OF THE INVESTIGATION

The mid 1980's witnessed a fundamental revision of geography curricula in the Federal Republic of Germany, comparable to that of the beginning 1970's. As a matter of fact it represents a reversal of the former development in that the regional approach in geographical education is given priority again.

Since the previous new orientation led to a greater emphasis on promoting a critical attitude in geographical education as compared to the situation before 1970 (cf. Volkmann 1984), it is of interest to see whether or not that change for the better has been afflicted by the present reverse orientation of curricula. For this purpose newly edited textbooks that follow the lines of the new curricula are evaluated on the basic assumption that textbooks allow the nearest possible approach to actual classroom work.

In the Federal Republic the individual states determine autonomously their educational system, e.g. how many periods a week and in which grades a certain subject is to be taught (cf. Volkmann 1988). Consequently the analysis of textbooks has to regard this differentiation and to ask to which extent textbook authors can realize their intentions. Are they bound to follow strictly a very tight curriculum, e.g. that of Baden-Württemberg, or are they left sufficient pedagogic space inside the given frame.

The new textbooks are devised for different school types which was not the case during most of the 1970's. Even in this regard different demands may be expected. This point, however, is not followed up.

The main concern of the study rests with the antagonism of Regional Geography versus Thematic Geography and the educational conclusions to be drawn from it. Consequently, only textbooks for grammar schools, grades 5 through 9 (students aged 10 to 15) are studied here, which make up the body of compulsory geographical education. (In Baden-Württemberg Geography is taught only in grades 5 through 8).

Thus four hypotheses are to be proved false or true:

1. The new textbooks support class-rehearsel and require

less critical judgement by the student than did the older ones (till around 1980).

2. A growing complexity of assignments over the schooltime that matches the students' developing intellect does not exist, since all regions are of the same high complexity (cf. Pollex 1987, 59).
3. There are no differences between textbooks for different states as far as student activities are concerned.
4. The given curriculum, especially in the state of Baden-Württemberg, does not allow much variation.

SURVEY DESIGN

It is the undisputed goal of geographical education to enable the student "to take part in a responsible shaping of his world" (MINISTERIUM für Kultur und Sport Baden-Württemberg, 1983, 7; cf. also Ihde, 1986, 13), based on a profound knowledge of his environment and the interdependence between humankind and the environment. To achieve this goal geographical education has to offer situations in which the student can develop these skills and abilities.

On the named assumption that textbooks provide the closest possible description of how classroom-work is organized, their assignments are analysed regarding the mode of activities. For the analysis the following scheme was developed which is influenced by Bloom's taxonomy but conceived to serve the specific purpose.

BASIC TECHNIQUES
  to localize
  to identify
  to calculate

COMPREHENSION (Reproduction)
  to describe
  to compare
  to classify

APPLICATION OF KNOWLEDGE (theoretical)
  to discriminate
  to explain, give reasons
  to examine

VALUING
  to judge
  to value

APPLICATION OF KNOWLEDGE (practical)
  to simulate planning and decision taking
  to find and evaluate information
  to employ problem solving strategies
  to carry one's point

The first two categories comprise activities by which the student acquires and trains a basic geographical (in the very first mainly a cartographic) literacy; the third reflects the cognitive level characterized by the use of geographical methods, concepts and terminology; the fourth refers to the affective domain in that the student is to express his opinion, thereby establishing and developing a value system; the fifth, finally, takes into account that the students must get the opportunity to design and/or perform investigations, which they might need later on as citizens. Occasionally the students even may get the chance to address an administrative body.

For better assessment of the classification a few examples are given. (for better readability there are not referenced).

- Localize your hometown. (to localize)
- Name the bordering states. (to identify)
- Which physical landscape impacts are connected with open pit mining? Cf. Landsat picture. (to identify)
- How does the native population view the establishment of National Parks? (to describe, as the answer is given in the text)
- Compare the drainage system of the Alb with that around Stuttgart. (to compare)
- Which is the biggest district? (to classify)
- Which are the differences between Herford and Sennestadt considering their plan, structure and age? (to discriminate)
- When were the pictures taken? (to discriminate)
- Why does the high wood consumption endanger the environment? (to explain)

  The operator (verb) is not always helpful, e.g.
- Compare the two statements: "Castes hold up progress."
- "For many Indians the caste is a protecting community against poverty." (The comparison is a valuation.)
- Play a family discussing alternatives for a new resi-

dence. (to simulate)
- Plan the inquiry of a farm. (to find information)

DISKUSSION

The results of the survey are shown in Figure 1. Four books were revised, two used in Northrhine-Westphalia (NW) and two in Baden-Württemberg (BW).

TERRA Geographie NW (1981-82) is structured along thematic lines. It becomes obvious that the amount of assignments belonging to the first two categories is reduced consecutively from almost two thirds to little more than two fifths. Especially in grade 9 valuing and the practical application of knowledge gain importance, due to simulations and inquiries in connection with themes like reorganizing agriculture, locating industries, revitalizing old housing quarters and building-regulations for new housing districts. To merge the contents for grades 7 and 8 in one volume was a habit in the 1970's followed by most publishers.

DIERCKE Erdkunde NW (1986-87) follows the new curriculum which officially is not yet in force. Here, too, the first two categories are reduced in a similar manner but regain importance in grade 9. This is due to different topics (distant regions) that do not allow e.g. inquiries. Comprehension assignments form a rather solid block over the years. Remarkable is the high percentage of valuing questions already in grade 8.

DIERCKE Erdkunde BW (1984-85) was produced by almost the same team. The first two categories have less weight in grade 5 and gain thereafter, while practical application is prominent in grade 5. It is a consequence of the fact that the home region is the main topic in grade 5 while in grade 8 far-away regions are tackled. Because of this many assignments which TERRA Geographie NW suggests for grade 9 are taken up in this textbook already in grade 5, e.g. the inquiry of a farm or a shopping street. Valuing gains weight in grade 8 mainly in connection with Japan, the USA and the Soviet Union.

TERRA Geographie BW (1984-86) shows some similarities in that the first two categories dominate in grade 6 (topic: European states) and a high percentage of applying assignments in grade 5 for the same reason as in DIERCKE Erdkunde BW. Generally valuing remains less important than in all other textbooks while reproducing tasks are highly dominant.

CONCLUSION

Coming back to the hypothesis formulated in the beginning.

1. It has been proved true only partly. Regionally oriented textbooks clearly give more space to comprehension assignments than do thematically oriented textbooks, but are in less demand of localizing the case studies. There are differences concerning the theoretical application of knowledge, but obviously more dependant on the authors than the curriculum (cf. the textbooks for Baden-Württemberg). This applies to valuing and practical application of knowledge, too.

2. It was verified. While the thematically structured textbook-set indicates a gradual shift to the last three categories, the regionally conceived textbook-sets show nothing of the kind.
3. It was falsified. Even given the same team of authors there are considerable differences between classroom activities which may be ascribed to growing experience of the team.
4. The last was proved false, too. Even the tight curriculum allows for substantial variations. A comparison of the categories comprehension and theoretical application of knowledge reveals this clearly.

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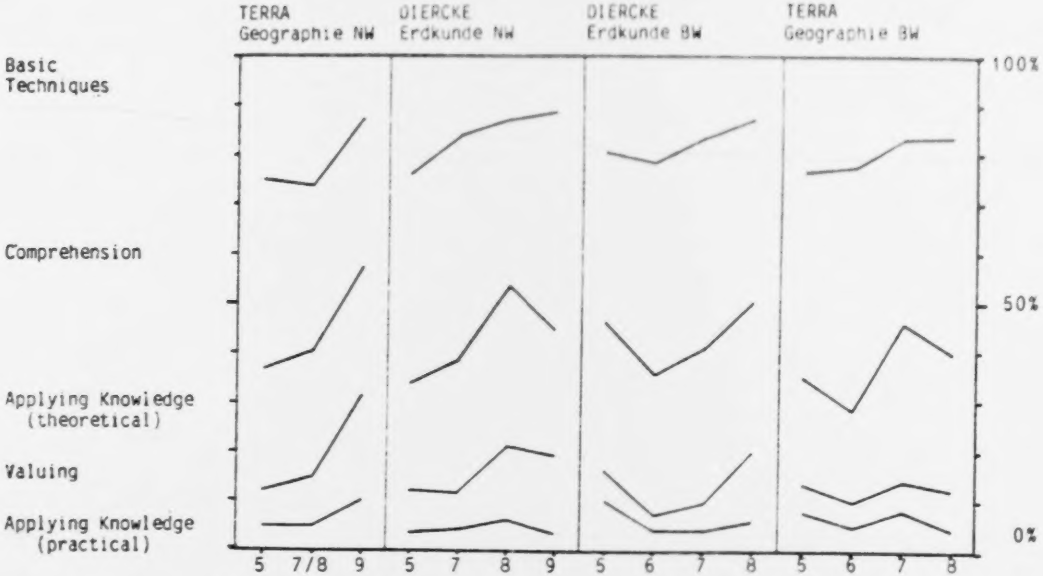

Fig. 1 Categories of Classroom Work in Selected Geography Textbooks (relative importance in percent of all assignments)

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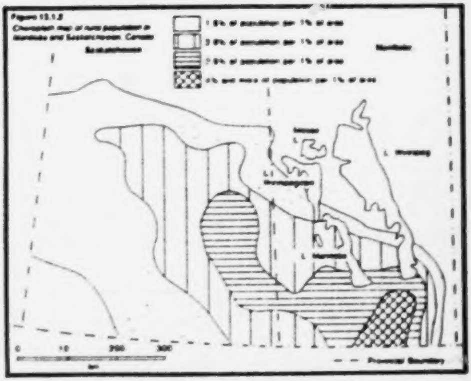

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Curriculum developments in geography for the 1990s

SKILLS, TEACHING STYLES AND LEARNERS ABILITIES CONSIDERED IN BASIC GEOGRAPHICAL PERSPECTIVES.

Ove Biilmann

ABSTRACT: Frameworks for elementary didactic analysis of the content of geography education are suggested and preliminary discussed in the light of current trends toward a stronger regional geographical orientation, integration and holism. Proposed organizing or defining principles for a Danish school geography serves as example and frame of reference.

1. Introduction.

The head quotes concepts not to say watchwords stressing the symposiums engagement in geographical educational planning and practice. These concepts may also lead our attention to well known questions which might be as topical as ever as f. ex. about the coherence between the basis of geography (knowledge, methods, theoretical structures etc.) and contemporary geographical education. Answers to that kind of questions are crucial for the capability of geographical education - and of geography teachers and geographical educational research as well - to meet traditional and actual demands or expectations. Questions of that kind are considered in this paper.

2. Basic scientific approaches and some implications for geographical education.

The scientific methodology of geography embraces the basic methods of science, social science and humanities i. e. that both traditional empirical studies and interpretation in humanistic sense contribute to geographical research. These basic modes of investigation and understanding are prerequisite to any geographical perception and knowledge. The geographer often intuitively interchange or integrate empiric and humanistic modes of study and explanation. (Biilmann 1979, 1985). So does the learner.

The changing or simultaneous use of different modes of description, analysis and explanation is commonplace and normal in scientific and educational geography. Nevertheless it for didactical purposes sometimes may be valuable to stress the character, strength and weakness of various methodological approaches.

The advantages and limits of the approaches mentioned therefore are taken for granted. So are the strengths and weakness acquainted with their use as teaching methods or activities When they are used independently the premises and possibilities of a traditional empiric or humanistic study or exercises may be drawn from epistomology and tradition of science and humanities respectively (e. g. Chappell 1981, Christensen 1982, Schaefer 1953).

Assuming that these educational problems are manageable, we are left with an other question of importance to geographical didactics and educational practice. This question is introduced by mentioning regional geography. More specifically the questions raised among other things are consequences of the interrelated (integrated?) use of different modes of description, analysis, explanation and representation normally connected with educational dealing with places, regions etc.

Following I attempt to sketch a simple model, which might be of some use when content, organization and practice of regional geographical education are considered. It occasionally may elucidate various questions relevant or even basic to all geographical education. In fact I only quote and develop well known principles and viewpoints (Paterson 1979).

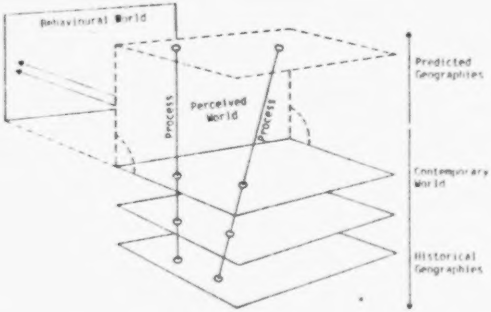

Fig 1. Geographic perspectives or "worlds" (Paterson 1975/79)

Geographers work and various "geographies" exist in or reflects different kind of "worlds" or perspectives. Patersons more than twenty years old diagram connects five of those and the dialectics of process and pattern (structure) in a clarifying way. It emphazise that geography and geographical education depend on different modes of study, explanation and representation according to the chosen perspectives or - more difficult but crucial to regional geography - combinations of or endeavours to integrate perspectives. Let us narrow the view to place, area or region.

3. Fashionable wishes and the difficult educational practice.

This is not a try to present **the** organization of the school subject, which is a complicated and highly context bound task. An example of the outcome of a specific endeavour of that kind is mentioned later. I only attempt to present a frame for didactic considerations on the content - incl. the skills, abilities and learning or teaching styles aimed at. This frame connects various perspectives clearly and makes

didactic dimensions as the regional-systematic dialectic, man/society-environment/nature and scale or regional level topical.
Something has been achieved, if use of that kind of didactic frames could further geographical educators reflections and clarify their mutual communications on the obvious but sometimes complicated interdependences between educational conditions and prerequisite epistomological premises tied to the content. There probably is a need for frames or tools, which in a simple way further didactic consideration, decision making and evaluation.

It should be possible to deal with these considerations and decisions without still repeating and being restrained by eternal discussions on the definition or character of geography. If so the perspectives of the Paterson model (fig. 1) could be specified to place or region. In that way we aim directly at our constant course of trouble: regional geography. (Regionalization as scientific analysis is not mentioned in this paper)

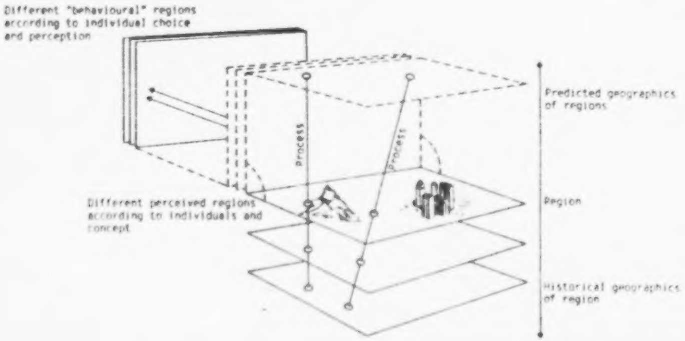
Different "behavioural" regions according to individual choice and perception
Process
Process
Predicted geographics of regions
Region
Different perceived regions according to individuals and concept
Historical geographics of region

Fig. 2. Regions (places) in different perspectives and perceptions.

Differences in perceived and behavioural "worlds" - here place or region - depending on context, viewpoint and individual are highlighted. The same applies for a well known challenge to geographical education: How to support the students acquiring of a rich individual place, region or world image which holds the common or contextual image to a degree, that further mutual communication with other people. The modifications implies a need for further considerations on methods (learning activities) and representations (sources). This is illustrated with image representations as example in the following diagram.

Comparisons of fig. two and three may draw attention to important interdependences between representations and modes of study. A successful interplay depends among other things also on character and size of the region as well as on the sources available.

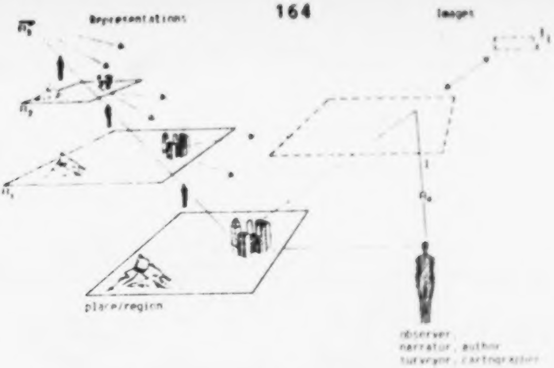

Fig. 3. **Representations and images of a region (place).**

At first the diagrams may only support the overview of troublesome combinations of didactic parameters. Then they are frames of reference and consideration. Later they hopefully may accommodate and further didactic work and educational practice - without bothering with de endless discussions mentioned above. At least they might provoke others to present simple frameworks or tools applicable to "daily" didactic and educational use.

In the following recent trends towards a more regional based geography education are touched upon. Discussions on teaching regional geography and broader discussion on e. g. integrated studies illustrate the needs for frames or models, who can accommodate didactic analysis and decision making on different levels.

Geographical education often has been tied to if not defined by places, regions, countries etc. Regions was recognized as a unifying if not integrating concept. The diagrams support consideration on this simple but problematic organization. They also draw attention to time or history as an important dimension, which often has been treated as such by geographers (e. g. Bird 1981, Giddens 1985, Hartshorne 1939, Sauer 1974).

Epistomological and educational geographical discussions have experienced many attempts to arrange space, time and later on nature/environment, individuals/societies and global phenomena in a integrative or at least unifying way. The strength and weakness of various arrangements are recently considered by Kellerman. He concludes that (Kellerman 1987):

"My purpose was **not** to argue that human geography **has** to be integrative, but to highlight established and ongoing attempts to reach integrative perspectives in geography. One may even wonder whether it is worthwhile to attempt integrative approaches. It seems that if the traditional and renewed interests in this line of inquiry in geography mean anything, it is that this is **one** of the objectives of the discipline. This perspective is not a new argument **per se**, but there is a difference between older and new traditions.

The old traditions integrated patterns and factors in rather empirical frameworks. The question remains open whether a new understanding of process and structure would eventually yield some new conceptual frameworks of integration that would permit more advanced empirical integrative studies in human geography. Given the traditions of geographers, the regional scale is most in need for attention."

Statements of that kind are of strong didactic relevance. It goes both for considerations in a geographical educational context and for more general often content indifferent or empty educational debates on integration, coherence, holism etc. The failure of content indifferent educational endeavours to catch and mediate even established knowledge areas has often been demonstrated. That is why there is a need of broad qualified subject and science based didactic efforts. Furthermore some trends or wishes reflected through these discussions are among the reasons why geography teaching has been severely cut back and - worse - youngsters often have a poor and biased world image and understanding.

These problems can not be solved alone by turning geographical education into environmental studies based among other things on ecology or systems analysis. A narrow ecological approach however well organized would miss important geographical perspectives and be subject to some of the critique mentioned earlier (Biilmann 1987, Kennedy 1979).

4. Various holisms and a "new" regional geography.

Teaching of geography and teaching of other school subjects as well experience a trend towards regional geography. This is both the consequence of problems created by earlier thematical, topical etc approaches and an adaptation to a request for meaning and overview or totalities, which are the followers of earlier demands for integration.

As geographical educators wee are faced with a double task. We must present a subject (content, organization etc.) which meet both traditional and new demands. That is extremely difficult in a often shrinking teaching time. At the same time we must legitimate geography, a unifying or integrative subject per se, against attacks supported by spokesmen for integration, coherence, environmental awareness, international understanding and responsibility etc.

Sound didactic work are prerequisite to create, describe and implement a coherent school geography applicable to current national and international demands. Work on the same lines may also support our efforts to demonstrate, that geography may contribute substantially to or be the best educational answer to the wishes put forward by various spokesmen of a better world, society or milieu.

5. Suggested organizing or defining principles for geography as a school subject: A draft aiming at Danish curriculum revisions.

- regional and systematic geography are complementary. Thematic or theoretical content should be introduced and learned through teaching on places, regions * or states (as far as possible). The teaching practice must emphasize specific regions (case studies) as well as a broad knowledge of states, major regions, continents and global phenomena.
- the scientific basis is science, social science, humanities as well as a tradition for integrated (holistic?) description, analysis and assessment of places, regions and global relations and problems.
- choice and organization of content should elucidate and stress central viewpoints and totalities * (relations?) (ecology, man-nature, the man made environment, localization, living conditions, regional differences, interdependences and antagonisms).
- the methods as reflected through learning activities are scientific as well as humanistic. That is why geographical explanations * is an important but troublesome part of learning and teaching. The student should (according to aims and content) work on confirmed scientific explanations, on source and other interpretation and localization analysis. Place and landscape should be experienced direct as well as mediated through various sources (Place or region at the same time is unique and reflects a complex of interrelating laws or mechanisms).
- the sources ** (teaching media) are many and varied. Their use combines scientific and humanistic analysis with experience and creative efforts. Traditional sources and exercises (map reading) as well as modern tools (scientific observation, informatics) are drawn upon.

*   to be considered further - epistomological, didactic and through guidelines for teachers.

**   to be considered further - theoretical, didactic, psychological and through guidelines for teachers.

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(The very few references only aim at the background to some key points).

WHAT INFLUENCES SCHOOL CENTRED CURRICULUM DEVELOPMENT? - THE TEACHER'S PERSPECTIVE

Graham Corney

ABSTRACT

This paper begins by reviewing the teacher's role in curriculum development in Britain, and the philosophy of the Geography, Schools and Industry Project. It then describes a research study conducted with Project teachers. This summarises the changes made by teachers in their schemes of work, and shows how teachers' motives, resources and support, and evaluation and feedback are factors affecting the feasibility of school centred curriculum development.

INTRODUCTION

The teacher's role in curriculum development

Between 1970 and 1985, curriculum development in geography in the secondary schools of England and Wales was closely related to three major projects: the Avery Hill, Bristol and Geography 16-19 Projects. Their aims were to change content, teaching strategies and, through the involvement of Examination Boards, assessment. Although their aims were similar, the projects had differing strategies for curriculum development. This is illustrated by the freedom which teachers had to make major decisions about new courses in relation to their own priorities.

Thus Avery Hill teachers, at least at the outset, were encouraged to introduce a specified course structure, using three multi-media resource kits; their decisions mainly related to devising local case studies to replace those published by the Project. In comparison, Bristol teachers were provided only with broad course outlines, and were encouraged to form local groups to devise, implement and evaluate their own courses. This process encouraged much greater teacher initiative leading to "enhanced professionalism" (Tolley and Reynolds, 1977). 16-19 Project teachers appeared to have freedom of action somewhere between the two.

The geography projects illustrate the patterns of curriculum development in England and Wales overall. In the 1960s and 70s, attempts at innovation consisted of the production by a research team of a package of materials and teaching strategies. These were then disseminated in the hope that teachers would adopt them and teach accordingly. In general, however, these attempts did not meet with the success which had been anticipated (see for example, Fullan, 1982, 245). More recent attempts have emphasised a school centred approach. Teachers evaluate their existing practice and establish their own priorities for curriculum development. They have greater control over change, and this increases their motivation and professional expertise. It has also been suggested that real change is more likely to occur if there is external support for teachers, for example through the existence of a project team which can act as a catalyst (Harlen, 1977; Waring, 1979, 1980; Slater, 1985).

Although many claims have been made about the perceived advantages of school centred curriculum development, there appears to be little research to draw on. The need for research particularly from the teacher's perspective has been noted by several writers (Hargreaves, 1982; Brown and McIntyre, 1982; Slater, 1985).

The Geography, Schools and Industry Project (GSIP)

GSIP was established by the Geographical Association in 1984 and is coordinated from the Department of Educational Studies at Oxford University. A development phase ran from 1984 to 1987, by which time 11 groups of teachers (80 schools) had been involved. Dissemination is planned from 1987 to 1989. The two aims of GSIP are:

1. to identify the contribution of geography teachers in helping pupils aged 11-16 to increase their economic understanding;
2. to involve geography teachers, together with other adults, in the development, evaluation and dissemination of activities designed to increase such understanding.

GSIP is concerned with changing both content and teaching strategies. This can be illustrated by four characteristics of Project philosophy:

1. to help teachers identify key issues and concepts related to economic understanding, and to develop these in a geographical context, at least initially in relation to their school's local economic environment;
2. to help teachers develop teaching strategies which encourage pupils to be actively involved in thinking, experiencing and communicating;
3. to help teachers involve other adults (industrialists and trade unionists) in planning courses, in working with pupils, and in evaluation;
4. to help teachers evaluate both their schemes of work and their approach to ongoing curriculum development, thereby enhancing their professional expertise.

The Project's approach to curriculum development takes account of the perceived advantages of school centred curriculum development noted above. Thus, GSIP operates as a partnership between teachers working in local education authority (LEA) based groups with an LEA appointed coordinator, other adults from their local community and a Project team based in Oxford (Corney, 1984, 47).

The research study

The aim of this research is to determine the teachers' perspective on the factors which influence them as they change the curriculum through their involvement with GSIP. In reviewing the literature, Mary Waring's 1980 paper was found to be extremely useful: her identification (p. 6) of the main factors which "so far as we know" seem likely to afffect the feasibility of "implementing an innovation and achieving its ends" was in itself a comprehensive summary, and also allowed other research studies to be directly related to it. Waring identified the following factors: teacher motives; teacher characteristics, understanding and involvement; demands on teachers and students; resources and support; evaluation and feedback.

Data was collected through a questionnaire of all 79 teachers involved in GSIP in June 1987 (response rate 71%) and a semi-structured interview, conducted with teachers in a sample of five local groups.

The remainder of this paper reports some of the findings from the questionnaire related to the changes implemented by GSIP teachers, and to the teachers' views about some of the factors influencing them.

RESEARCH FINDINGS AND INTERPRETATION

The changes made by teachers through their involvement with GSIP

Figure 1 contains information about the new schemes of work planned and implemented by GSIP teachers.

In relation to the type of industry specified, service and

TYPES OF INDUSTRY	NUMBER OF MENTIONS
Miscellaneous services	6
Distributive	5
Power	3
Other heavy industry	3
Light industry	2
Extractive	2
Tourism	1
Agriculture	1
Total	23

TOPICS	NUMBER OF MENTIONS
Local industry	7
Changing industry	7
Location of industry	6
Internal organisation of industry	5
Industry and the community	4
Employment/unemployment issues	4
Industry outside Britain	2
Consumers	1
Total	36

AGE GROUP	NUMBER OF SCHEMES
10-11	1
11-12	5
12-13	8
13-14	11
14-16	24
16+	1
Total number of schemes recorded	50

TIME (HOURS)	NUMBER OF SCHEMES
5 or less	4
6-10	20
11-20	19
more than 20	8
Total number of schemes recorded	51

Figure 1. New schemes of work

Note: Types and topics are not mutually exclusive distributive industries accounted for almost half of those mentioned; correspondingly extractive, metal and other heavy industries were recorded less frequently or not at all. This pattern differs markedly from that recorded in an earlier national survey (Corney, 1986, 13-17).

The topics specified in new schemes of work showed a much broader range than in the previous survey where there was considerable emphasis on location, environmental, and to a lesser extent employment issues.

New schemes of work have been introduced across the Project's target (11-16) age range; the actual number of schemes increased in relation to successively older age groups. The time allocated to schemes of work showed that most were of 6-10 hours or 11-20 hours duration.

Figure 2 provides greater detail about the changes.

Related to content, the most important changes mentioned were a contribution to economic understanding, a broader interpretation of industry, and greater emphasis on local industries and issues. Very few teachers recorded "little or no change" in content.

Related to teaching and learning strategies, the major changes included more active learning, more groupwork, more or different fieldwork and more simulations or role play. Few teachers recorded "little or no change", most stating that they were already implementing more active styles.

Related to AOTs, more teachers recorded more/changed use than little or no change; the difference, though significant, was less marked than in content and teaching strategies.

Related to evaluation, major changes were recorded for teacher evaluation and pupil evaluation; the latter included pupil self evaluation. Fewer teachers recorded little or no change.

CHANGES IN TEACHING	NUMBER OF MENTIONS
CONTENT	
Stated contribution to economic understanding	17 (includes 8 recording specific concepts)
Broader interpretation of industry	17 (includes 7 recording greater emphasis on tertiary/quaternary activities 3 recording internal structure of firms 3 recording Trade Unions/industrial relations)
More emphasis on local industries/issues	11
Total changes mentioned	55
Little or no change recorded	3
TEACHING AND LEARNING STRATEGIES	
More active/experiential/pupil centred learning	35 (includes 9 recording decision making)
More groupwork	25 (includes 7 recording discussions/oral work)
More/different fieldwork	13
More simulation/role play	11
More use of audio-visual resources	5
Total changes mentioned	89
Little or no change recorded	5
INVOLVEMENT OF ADULTS OTHER THAN TEACHERS	
More use	12
Change in use	8
Total changes mentioned	25
Little or no change recorded	14
EVALUATION	
Teacher evaluation - more/changed use	22 (includes 9 recording more conscious/systematic use 8 recording self-evaluation)
Pupil evaluation - more/changed use	20 (includes 14 recording pupil self-evaluation)
Total changes mentioned	48
Little or no change recorded	12

Note: the table includes the most frequently mentioned changes and the number of teachers recording little or no change for each category

Figure 2. Changes in Teaching

In the context of the changes which teachers made, it is now possible to examine their views about three of the factors which Waring (1980, 6) suggested may be an important influence - teachers' motives, resources and support, evaluation and feedback.

Teachers' motives

Teachers were asked to state the reasons for their choice of topic in GSIP; their answers reveal a variety of motives (Figure 3).

For the 14-16 age range, the major reason mentioned was preparation of a new/expanded topic for GCSE (the new national 16+ examination first taught for in 1986). Other important reasons included other aspects of content (local issues, economic understanding) and the preparation of new materials; six teachers recorded the need to increase pupil motivation.

For the 10-14 age range, motives were similar with the exception of GCSE, although even here it exerted some influence; pupil motivation was mentioned less frequently, and cross-curricular links were mentioned more frequently.

The motives of GSIP teachers, therefore, illustrate the importance of changes in public examinations noted by Waring (1980) and others, and demonstrate that involvement in GSIP could help teachers meet those needs.

Meeting the needs of pupils is also recognised by several writers (for example, Harding, 1978). Some of the other motives suggest that teachers have understood Project philosophy and have incorporated this among their concerns.

Resources and support

From a survey of the literature, a list of potentially

14-16 AGE RANGE	NUMBER OF MENTIONS	10-14 AGE RANGE	NUMBER OF MENTIONS
CONTENT		CONTENT	
To prepare new/expanded topic for GCSE	19	To extend existing topic	8
To develop a local issue	10	To introduce new topic	5
To increase economic understanding	5	To develop a local issue	5
Topic suggested by pupils	1	To increase economic understanding	4
		Not restricted by exam syllabus	3
TEACHING STRATEGIES		TEACHING STRATEGIES	
To develop teaching strategies	7	To develop teaching strategies	6
To develop local contacts/AOTs	3	To develop local contacts/AOTs	3
PUPIL MOTIVATION		PUPIL MOTIVATION	
To increase pupil interest/motivation	6	To increase pupil interest/motivation	2
MATERIALS		MATERIALS	
To prepare new materials	5	To prepare new materials	2
LINKS		LINKS	
To develop links with		To develop cross-curricular links	4
- TVEI	1	OTHER	
- careers/work experience	1	Good preparation for GCSE	5
TOTAL	58	TOTAL	52

Note: these categories are not mutually exclusive

Figure 3. Teachers' Motives: Reasons for their choice of topic

supportive people and factors was compiled. Teachers were asked to comment on the influence of each and the results are reproduced in Figure 4.

In terms of people, teachers reported that their GSIP coordinator and teachers in their local group were a major influence.

These were followed in importance by a member of the Oxford team. Correspondingly, the headteacher and teachers in their school were seen as much less influential.

Time was recorded as the most important factor overall; finance was rated much less highly.

GSIP courses were more influential than materials and finance.

Shortage of space does not allow a full interpretation of these results, but two important conclusions can be stated.

1. The value of a local network in supporting innovating teachers is stressed by many writers although evidence from teachers is limited. This group of teachers, working in 11 groups each with a coordinator, suggest that such a network does help to promote curriculum development.
2. Similarly, writers tend to link time and finance as supportive factors whereas the teachers in this survey evaluated them very differently.

Evaluation and feedback

Various aspects of evaluation and feedback are noted by writers as helping the teacher in innovation. An interesting perspective is that offered by Brown and McIntyre (1982) who consider the notion of costs and rewards to teachers. This idea was incorporated in the questionnaire, and teachers were asked to list the main professional rewards and disadvantages of their involvement in GSIP. The results are summarised in

PEOPLE/FACTORS	INFLUENCE			
	MAJOR	SOME	MAJOR /SOME	NO DIRECT
1. Your headteacher	12(11)	24	36(11)	64
2. Teachers in your school	18(9)	33	51(9=)	49
3. Teachers in your local GSIP group	51(4)	35	86(2=)	14
4. Your local GSIP coordinator	53(3)	35	88(1)	12
5. A member of the Oxford team	43(6)	43	86(2=)	14
6. Time allowance/supply cover	60(1)	21	81(6)	19
7. Extra finance	20(8)	31	51(9=)	49
8. GSIP materials - schemes of work	24(7)	60	84(4=)	16
9. - Information Exchange (iv)	16(10)	68	84(4=)	16
10. GSIP courses - your LEA	46(5)	31	77(7)	23
11. - Annual Conference	56(2)	12	68(8)	32

Notes: (i) Teachers were asked to rate each person/ factor on a 3-point classification: major/some/of no direct influence

(ii) Figures record percentage of teachers (total returns = 54)

(iii) Numbers in brackets denote rank order

(iv) Information Exchange is the Project's termly journal

Figure 4. Resources and Support: People and factors influencing teachers in the development of their work

MAIN PROFESSIONAL REWARDS	NUMBER OF MENTIONS
Working with other teachers	23
Professional stimulation	23
Developing new teaching approaches	22
Pupil involvement and enjoyment	10
Involvement of AOTs	9
Total	106

MAIN PROFESSIONAL DISADVANTAGES	NUMBER OF MENTIONS
Pressures of time	20
Classes having too much supply cover	6
Pressure to produce	3
Restricted participation in other initiatives	2
Total	39
No disadvantages	12

FAILED EXPECTATIONS	NUMBER OF MENTIONS
Lack of resources (including finance)	7
Lack of coordinator/colleague support	7
Lack of time	7
Liaison with AOTs	5
Total	29
None	23

BALANCE BETWEEN REWARDS AND DISADVANTAGES	NUMBER OF MENTIONS
Balance for rewards	44
Not applicable	6
Equivocal comments	4
Total	54

Figure 5. Evaluation and Feedback

Figure 5.
The main rewards were working with other teachers, professional stimulation and developing new teaching approaches. These were followed by pupil involvement and enjoyment.
Pressure of time was listed as the main disadvantage; half as many teachers listed no disadvantages. Similarly, a large number of teachers stated that they had no failed expectations while others noted lack of resources, lack of support, and lack of time. Finally, in balancing the rewards and disadvantages, 44 of the 54 teachers saw the balance favouring rewards.
This data provides evidence to support the views of writers that evaluation contributes information of help to the innovating teacher, through the sharing of ideas and the process of evaluation itself; it is also invaluable to those designing curriculum development projects.

CONCLUSIONS

Major conclusions of the study include the following:

1 54 teachers provided details about new schemes of work they have implemented; major changes have been made in content, teaching and learning strategies, and evaluation;

2. teachers recorded a range of problem-solving motives which influenced curriculum development, the most important related to the introduction of GCSE;

3. teachers recorded a range of factors and people which influenced their work; the most important were the GSIP coordinator, teachers in the local group and the factor of time;

4. teachers evaluated their involvement in GSIP; the rewards far outweighed the disadvantages.

This short paper has presented a small sample of the results of a larger scale survey. More detailed analysis and reporting of the results is in progress. It is anticipated that the data will provide useful evidence to help people planning curriculum development projects.

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CURRICULUM DEVELOPMENT AND EVALUATION OF TEST QUESTIONS

Modest Goossens

Abstract

The vast majority of secondary schools in Flanders (Belgium) are to adopt the so-called "eenheids" or uniform structure on 1-9-88, replacing education types 1 and 2, a change which has caused a great deal of controversy. A new uniform curriculum for geography has also come into force. In two Flemish provinces an analysis was made of 11,725 test questions on geography put to pupils in the first year of secondary education at over 222 different schools during the 1985-1986 school year. Data on the schools, the teachers and the test questions were computer processed and correlations determined in order to evaluate school types 1 and 2 and the various elements in the new curriculum. The conclusions constitute interesting points for reflection and discussion, primarily for those responsible for adjusting and supervising the curriculum in Belgium, but also in the context of the "curriculum development" subtheme of the 1988 Brisbane symposium.

Introduction

Didactic research has been started in the Faculty of Sciences at the University of Louvain (Belgium) in cooperation with teachers (geography, biology and chemistry) and educationalists, working on the basis of the analysis of test paper questions. Preliminary research had previously been carried out with regard to geography in 28 schools over the six yaers of secondary education. The results obtained are taken into account in the wider survey which is discussed in this article and which deals exclusively with the first year of secondary education, later being systematically extended to include the following years.

1. THE CONTROVERSY SURROUNDING THE NEW EDUCATIONAL STRUCTURE

On 1 September 1988 the uniform structure will be introduced in Catholic secondary education in Flanders, starting with the first year and progressively moving up the school year by year until, after six years, it applies to secondary education as a whole. 71 % of all pupils in Flanders follow Catholic secondary education, the remainder attending state schools (19 %) and provincial or municipal schools (10 %).

The controversy surrounding the uniform structure has been heated and acerbic. In order to understand the sentiments involved some background knowledge is absolutely essential. This will be confined to that which is relevant to the test paper survey.

The foundations of the Renewed Secondary Education (type 1) are laid down by the law of 19-7-1971. This constitutes an integrated system of education as opposed to the traditional form with its clearly separated technical and humanities schools (type 2). Since the passing of the aforementioned law, type 1 has been introduced throughout Wallonia and in all state, provincial and municipal schools in Flanders. The Catholic schools in Flanders were free to decide whether or not to go over to type 1 on the basis of the advice of the teaching staff and the parents'associations. Approximately 50 % of these secondary schools have since adopted the type 1 system, although they are far from evenly distributed throughout Flanders. Some areas remain resolutely committed to the type 2 system. Those responsible for education are now determined to implement a standard system, the so-called uniform system, which is to be a compromise between types 1 and 2. This system is to be progressively and obligatorily introduced as of the coming school year.

2. COMPARATIVE EVALUATION OF TYPES 1 AND 2

In the Faculty of Pedagogical and Psychological Sciences of the University of Louvain an interesting survey was carried out among 6000 students who had made the transition from secondary to higher education. The aim was to determine any relationships between choice of study, results obtained, social background, nature of secondary education etc. Some of the results are of great importance for the purposes of this study. We shall consider in particular the conclusions reached regarding educational systems types 1 and 2.

In conclusion it may be said yhat the differences between types 1 and 2 are note the result of inherent structural differences. This means that there are no grounds for claiming that type 1 or type 2 is the better system, or that one or the other improves the changes of success in higher education. The differences between the two types are primarily the result of the nature of pupils. In order to differentiate between types of education and subjects and to explain the pupils who move on and passes achieved, the intelligence and acquired knowledge of the pupils are very important. However, the social-economic milieu from which the pupils originate influence the choice of subjects, in both secondary and higher education. The differences between types 1 and 2 are, however, intertwined with differences between the schools as strong and weak schools and strong and weak classes can be found in both types of education. The comprehensive study concludes by indicating that the results in particular subjects and even more the nature of the tests provide a suitable basis for making a comparaison between types 1 and 2. Before proceeding to a consideration of geography tests, the position of geography in the study and training package of a secondary school requires explanation.

3. NEW GEOGRAPHY CURRICULUMS

During the first year of type 1 secondary education the majority of the subjects are compulsory, with certain exceptions. This is most definitely not true of the type 2 system. However, in the more advanced years both systems provide considerable scope for specialisation.

Some subjects remain common to all pupils throughout the school, irrespective of type. These include religion, history and geography. The idea is that secondary education must take into account the nature and talent of individual pupils and most consequently provide a number of specific orientations by differentiating between various courses of study. However, the quality of secondary education also implies certain values; values of life which apply to all pupils.

The initiators of the uniform system have made geography a compulsory subject for all pupils throughout their course of secondary education, although unfortunately limited to very few lessons per week. Extensive consultation with geography teachers revealed that they too are in favour of compulsory geography for everyone, in addition to specialisation in physical geography, human geography or economic geography with more lessons per week but restricted to a few subjects. In this respect the curriculum committee was in advance of the uniform structure. In all on-going educational systems a new uniform geography curriculum with the same course content is being imposed.

Broadly speaking the uniform curriculum amounts to an introduction to geography in the first year through the study of the pupil's immediate environment and a selected regional study of Belgium. In the second year this expands to include Europe as a whole and in the 3rd and 4th years regions oudside Europe are studied. In this way the pupils gain a general picture of the world as a whole by the end of the 4th year, achieved through complementary and illustrative themes so that regional geography is not in itself sacrosanct. In the 5th and 6th years general geographical themes are included in the curriculum; these are based, as appropriate, on the whole world, the Third Workd, the European Community or Belgium.

4. ORGANISATION OF THE STUDY ON TEST QUESTIONS

The first year of secondary education is of primary importance to the study, on the one hand because the pupils have only recently moved up from the primary schools (very heterogenous origins and ability-interest) and on the other hand because they are confronted with a same geography curriculum in both types 1 and 2. It therefore provides a fascinating study of conclusions and explanations concerning test paper differentiation.

The study was carried out in 222 schools, 149 of which were in the province of Antwerp and 73 in the province of Limburg.
It concerned a total of 11.725 test questions (7937 in the province

of Antwerp, 3788 in the province of Limburg). The analysis concerned the characteristics of schools and teachers, as well as aspects of the didactic nature and content of the questions asked during the 1985-1986 school year.

The analysis of the characteristics of schools and teachers considered the address of the school, educational system and departments at the present time and prior to the switch to type 1, the number of test papers per school year, whether the questions were prepared by teachers working individually or as a team, whether the school was a boys'school, a girls'school or mixed, the sex and qualification of the teacher and the number of years teaching in the first year. The following characteristics were determined for each test question: section of the curriculum, the region, excursion, knowledge tested, type of question, operation-product-content according to Guilford, degree of difficulty, operational verb, question sections. Only the main characteristics of the questions are taken into account in their mutual correlations and vis-à-vis the characteristics of the schools and teachers. The tables are not included in this article.

5. ANALYSIS OF THE CARACTERISTICS OF THE SCHOOLS AND TEACHERS

There are a few fundamental differences between the two provinces studied. Approximately 2/3 of the schools in Limburg are of type 1, compared with 1/3 in Antwerp. In Limburg 4/5 of the schools are mixed, in Antwerp less than 3/5. All type 1 schools are mixed in Limburg, whereas in Antwerp this is true of only half of them. Resistance to changing to type 1 seems stronger in boys'schools than in girls'schools, and stronger in Antwerp than in Limburg; resistance is strongest in specifically technical schools for boys.

In Antwerp 2/3 of the summary test questions in the first year were prepared by individual teachers while in Limburg half of them were prepared by a team of teachers, this clearly being a type 1 characteristic. In Antwerp 2/3 of the geography teachers are women, compared with only half in Limburg. Antwerp is a far more urban area with more women in the teaching profession. The situation as regards diplomas is also more advanced in Antwerp.

The average percentage of the marks obtained per class is higher in type 1 schools than in type 2. In specifically girls'schools higher marks are obtained than in boys'schools.

6. ELEMENTS INCLUDED IN THE CURRICULUM

The curriculum provides for the following number of lessons for each element: landscape and map 6, relief 7, rocks 3, weather-climate [illegible], population-habitation 7, industry 5, agriculture 4, tourism 4, synthesis of the immediate environment 3. We assume that a balance exists between the number of lessons given and the number of questions asked. In this way we know the expected proportion of questions per element in the curriculum. In both Antwerp and Limburg there is a significant difference between the expected and recorded numbers. This difference is greatest with regard to the first and last of the aforementioned elements in the curriculum. Landscape and map are strongly over-represented, in Limburg even more so than in Antwerp; apparently people take things very easy at the beginning of the school year. Tourism and synthesis of the immediate environment are severely under-represented; apparently at the end of the school year there is no time left to deal with the last elements in the curriculum.

7. IMPORTANCE OF THE REGIONS

The region to which a test paper question applies can differ greatly depending on the location of the school and the interpretation of the curriculum. The latter clearly indicates that an introduction to geography as regards knowledge and abilities should be effected with reference to the pupil's immediate environment and Belgium. In the first year there is therefore no place for questions on Europe or other parts of the world. The analysis of the regional nature of the test questions only took into account the most important regions, those which are expressly mentioned in the curriculum.

It is impossible to give the expected frequency per region with which the frequency actually recorded can be compared. However, some extreme deviations from the curriculum are evident.

1. First of all there is the bewildering fact that approximately half the test questions do not relate to any region whatsoever. Rather than providing an introduction on the basis of Belgium and the pupil's own immediate environment many highly abstract general geographical questions were set, which did not have any specifically spatial relevance - geography without location.

2. Almost one quarter of the test questions concern other regions of Belgium than those mentioned in the curriculum or Belgium as a whole. This, too, gives rise to some disquiet as to whether the curriculum is being correctly interpreted. The explanation for this is to be found in the continuing existence of the old curriculum in type 2 schools.

3. The test questions which refer to the immediate environment account for 8.8 % of the total. This is a surprisingly low percentage in the light of the overall thinking behind the curriculum.

8. QUESTION TYPES

There are many different kinds of question and these kinds of question can be considered in two ways:

1. By considering the language of the questions, that is the language used by the teacher as the poser of the question. The means of communication (exclusively words, figures, symbols or graphical representations), whether or not spaces to be filled in are used (in a sentence, text, chart, table, drawing). Whether or not the question is dependent upon a context. The language of the question will be considered in greater detail, adapted to the geographical specificity.

2. By considering the question type, that is the nature of the answer expected from the pupil as the receiver of the question. The externally observable activities of the pupil are studied, that is, what the pupil actually has to do.

The following considerations concern the question types. Didactical literature distinguishes between many different types. For an introduction to geography we believe that the following types are relevant: Correct/incorrect questions, arrangement questions, multiple choice questions, short answer questions, free answer questions, drawing answer questions. For the latter type of question the pupil's answer should take the form of a graphical representation (chart, diagram, map), which must be either drawn from scratch or completed. The literature often does not specifically mention this type of question, but considers it as a form of short answer question. In geography the graphical component is, however, so important that we are according in the status of an individual category of question.

From the computer data we are able to formulate the following noteworthy conclusions and considerations. The great majority (54 %) of the test questions are short answer questions; in Limburg these account for 2/3 of the questions set, confirming the hypothesis that type 1 schools are strongly oriented towards this type of question. The free answer question also scores high, accounting for 1/6 of the questions; these are more important in Antwerp and therefore a preference of the type 2 schools. The multiple-choice questions occur with equal frequency in both provinces, that is [illegible]; this percentage should however be qualified to some extent: on the one hand there are teachers who ask exclusively multiple-choice questions, while others never ask them, but on the other hand the total number of questions asked in the course of the school year is much larger as regards multiple-choice questions than as regards other question types, which pushes up the percentage for the question type. The total number of test questions set in the course of the school year varies significantly, ranging from 17 (type 2 school with purely semantic questions) to 102 (type 1 with the emphasis on multiple-choice). The arrangement and drawing answer questions occur on average with the same frequency as the multiple-choice questions. Finally, the use of correct/incorrect questions remains very limited.

9. INTELLECTUAL OPERATIONS, PRODUCTS AND CONTENTS

In preparing test questions it is necessary to ensure that all the various elements of the material studied come into consideration, as regards both content and abilities. In order to achieve this it is necessary to avoid measuring one facet of intellectual activity at the expense of another. The questions must be classified analogously with the classification of objectives in order to assure this. We prefer the Guilford intelligence cube, slightly adapted to the specific ways of working in geography. The three dimensions of operation, product and content are dealt with in turn.

Under the heading intellectual operations we have slightly modified the denominations of the five categories. In the first year of secondary education the intellectual operation of "memory" appears to be greatly over-tested, with 2/3 of the questions coming into this category. "Cognition", the most elementary intellectual operation, accounts for 18.5 % and convergent thinking for 16 %. Divergent thinking and critical thinking are categories which one would expect to find less often where the under-twelves are concerned; they are in fact rarely found. It is notable how in both provinces observation and convergent thinking have a high correlation with type 1 and teams of teachers. Memory is important in type 2 technical schools. As expected, critical thinking is more commonly tested by free answer questions whereas drawing questions score high for convergent thinking and observations.

We have have also slightly modified the intellectual products; especially the first two categories (facts-units, concepts-categories). Of the total number of questions, 44 % concern facts, 35 % relationships and 17 % concepts. Understandably in the first year questions are only rarely related to systems (3 %); even less numerous are those concerning transformations and implications.

The intellectual content (language of the question) had to be radically changed for the purposes of the geographical test questions. This concerns the language of the question, the way the teacher formulates the question. We opted for a classification comprising five different categories: question with text, with numerical data, with a map, with a figure and a purely semantically formulated question. Although, over recent years, teacher training, inspection, teaching publications and further training have all argued strongly against purely semantic questions, these still account for approximately 53 % of all questions; there is consequently a great deal of scope for improvement in this area. The map questions constitute the second most important group, with 23 %; Limburg does better in this category. The figure questions based on photographs, charts, graphical representations etc. rank third with 15 %, although Antwerp comes out somewhat better in this category than Limburg. Questions with statistical data account for 8 % in both provinces and questions with texts are also used to an equal extent in both provinces, but with a frequency of just 1.3 %.

10. DEGREE OF DIFFICULTY

Taken both provinces together 20.4 % of all questions are classed as very easy, 52.7 % easy, 24.4 % average, 2.2 % difficult and only 0.3 % very difficult. If the weighted average is then calculated (very easy 1,..very difficult 5) per school, then the easiest test paper achieves 1.3 and the most difficult 3.0. Both these extreme cases belong to type 2, the weakest is a technical department and the strongest Latin. On average type 1 has more easy questions than type 2; this is also indicated by the weighted average, both in Limburg and in Antwerp. The number of difficult questions in higher among male than female teachers. Teachers who have received no training in geography set easier questions than those with a qualification in geography. The age of the teachers does not, on the other hand, have any bearing on the degree of difficulty. The relationschip between degree of difficulty and question type appears as follows: correct/incorrect questions correlate very positively with very easy questions, while questions requiring an answer in the form of a drawing usually range from average to difficult. The free answer questions rank among the most difficult; they clearly score negatively among the very easy questions. The multiple-choice questions are also less in evidence among the average or difficult questions.

CONCLUSIONS FOR DISCUSSION

The majority of the conclusions provide interesting material for discussion. That is why no differentiation is made in this article between the discussion points and the conclusions. We will set them out in the form of derived postulations:

- In the envisaged uniform structure teachers and those responsible for developing educational policy favour the inclusion of geography among the general educational subjects which are compulsory for all pupils in every school year.
- The new geography curriculums have been brought into line over recent years in both type 1 and type 2 schools, although in type 1 two and in type 2 only one lesson per week is devoted to an introduction to the subject through the immediate environment and Belgium.
- Resistance to changing from te traditional type 2 to type 1 was stronger in technical boys'schools and much stronger in the urban area of Antwerp than in Limburg.
- Many more questions were prepared by teachers working in teams in type 1 schools.
- In urban Antwerp there are more women teachers, more teachers have a diploma in geography than in Limburg, but the pupils are given more difficult questions and lower marks.
- The new curriculum is quite rigidly applied. The first points do however receive more attention than was foreseen, while the last are virtually ignored.
- The test questions do not reflect the importance of the immediate environment and Belgium, because half of the questions are not based on regions and only 10 % concern the pupil's immediate environment and region.
- Short answer questions are very dominant, especially in type 1 schools, while the free answer questions are typical of type 2 schools were individually-prepared questions predominate.
- 2/3 of the test questions relate to the intellectual process of memory. Observation and convergent thinking are more common

in team questions and in type 1 schools.

Facts and relationships are dominant among the intellectual products. Purely semantically formulated questions account for 51 % of the total number of questions. Questions involving maps and figures do, however, account for one third and are better represented in type 1 schools.

- The degree of difficulty is slightly higher in type 2 schools but varies greatly from school to school.

RESOURCE PRODUCTION CENTRES, CHANGE AGENTS IN CURRICULUM DEVELOPMENT

John Macaulay

ABSTRACT

In this time of curriculum change, commitment in many countries to increasing internal assessment at senior school level and a much wider use of non-book learning materials, a need has grown for a network of non-commercial, small-scale publishing organizations with a concern for quality control. This paper describes the role of resource production centres and illustrates their work by describing the Geography Resource Centre under the aegis of the New Zealand Geographical Society. It proposes some guidelines for the development and maintenance of these centres and mentions a threat to their continued operation.

INTRODUCTION

At times of major curriculum change the continual supply of supportive resource materials is essential. This is particularly important when the new syllabus involves whole or partial internal assessment, as with the recently-introduced New Zealand Forms 5-7 (Years 11-13) integrated geography syllabus. Much valuable material can be provided by a properly-functioning resource production centre, particularly if it has built up strong links with curriculum developers, teacher educators and the national or state community of geography teachers.

Objective:

The objective of this paper is to propose some guidelines for the development and maintenance of resource production centres, using the Geography Resource Centre of the New Zealand Geographical Society as an illustrative source.

Definition:

In this context a resource production centre is defined as a non-profit making institution concerned with the compilation, production, sale and distribution of a variety of book and non-book resources to support the teaching of a subject or section of the school curriculum. It differs from a 'teacher' or 'education' centre, which usually has a wider role, promoting in-service courses for a more comprehensive range of curriculum levels, linked with resource production and distribution, mainly to meet local and regional needs on an 'ad hoc' basis.

Of course, where both a resource production and an education centre are situated near each other, some complementary work is possible. The former can compile some resource material solely for regional distribution and in return be supplied with some help with production graphics, e.g. the use of a word processor and laser printer for the design of booklet covers.

ADVANTAGES OF OPERATING A RESOURCE PRODUCTION CENTRE

The chief advantage of operating a resource production centre is that it offers teachers a number of useful materials which cannot be produced as quickly and economically on a commercial basis, because the market is too small for their print runs to be practicable. These runs are usually of only 50-150 copies of booklets and slide sets. For videotapes, diskettes, PVC-coated wall maps and audiotapes, a 'run' of 10-20 copies is often sufficient. Fast yet efficient editing and production are essential, especially when 'pilot' materials and guidelines for new syllabus approaches are needed.

The Geography Resource Centre

The range of materials produced and/or stocked by a resource production centre can be illustrated by the summary of the Geography Resource Centre's 1988 catalogues given in Table 1.

TABLE 1

SUMMARY OF THE GEOGRAPHY RESOURCE CENTRE'S

1988 GEOGRAPHY AND SOCIAL STUDIES CATALOGUES

	Nos.	Added Since 2/87	Withdrawn 12/87
Resource units (compiled by teacher trainees)	79	3	5
Instructional units (teacher compiled)	18	0	1
Slide sets	22	3	4
Resource packs	4	1	1
Topographic map extracts	9	2	
'G' series booklets	8	1	
Microcomputer diskettes	4		
Audiotape	1		1
PVC coated wall map	1		
Videocassette	1		
	147	10	12

An appraisal of the range of items will show that only 15 of the 147, the map extracts, the diskettes, the videocassette and the wall map, are intended for direct use by secondary students and that some 25 per cent are non-book items. In other words, there is a strong emphasis towards the provision of 'teaching aid' materials, not textbooks.

Table 1 shows that the next most numerous items to the resource and instructional units are the slide sets, mostly of 12-15 frames but varying between 8 and 24. These sets have proved very popular with teachers and a most practicable format for visual resources. Copies are less expensive to produce than filmstrips, movie films or videocassettes, permit much flexibility in use and can be easily supplemented from a teacher's personal collection.

There is a keen demand for most of the topographic map extracts, although not many are available at one time. They are all overruns, arranged when examination papers are printed, so further printings are seldom feasible.

Many orders are received for the few diskettes, with their associated documentation. Unfortunately few have been donated to the Centre, largely because it cannot offer payment for these programmes which often take so long to develop that the authors feel that they deserve some cash return.

Other Advantages of Operating A Resource Production Centre:

1. If care is taken to produce essentially 'copyright-free' or original material, it can be published in teacher-guide format, facilitating the making of class sets of activity guidelines and/or transparencies for overhead projection.

2. If strong formal or informal links are maintained with pre-service and in-service education course controllers, an avenue can be provided for the publication of materials valuable enough to be shared with other teachers. A resource production centre can offer advice and support in the professional preparation of this material, giving compilers more information in sharing their original work.
3. As long as editing and managerial services are available voluntarily or through external support, a 'user-pays' system can cover the costs of advertising, production and distribution. Such a system also encourages teachers to obtain only the materials seen to hold some value and tends to be a less wasteful one than free issues of materials.

Conditions Favouring the Operation of Resource Production Centres

The successful development and maintenance of a resource production centre such as the Geography Resource Centre has been favoured by the following conditions:

1. The support of a parent organization such as the New Zealand Geographical Society, which supplied the funds for the initial publications, followed by loans and guarantees when there have been temporary cash flow problems. Such a link also supplies advertising opportunities and the chance to operate a 'membership discount' scheme for the mutual benefit of both parties.
2. The provision of accommodation and 'almost at cost' printing services by a supportive institution. Christchurch Teachers College kindly offers these

services to the Geography Resource Centre.

1. Continuing co-operation with the staff and students of an associated institution for compiling materials of a sufficient quality to merit publication. Christchurch Teachers College staff and students are the major compilers for the Geography Resource Centre. Some teachers in Christchurch and elsewhere, mainly in the South Island, and some geography teachers' associations also supply much useful material. The Curriculum Development Division and Secondary Inspectorate of the New Zealand Department of Education have given valuable assistance by arranging brief secondments of teachers to write instructional units.
1. Help with graphic art from draughtsmen and/or microprocessing operators. For the past decade the draughtsmen of the Geography Department of the University of Canterbury have given invaluable help to the Geography Resource Centre. More recently this has been supplemented by skilful assistance from the operators of the Apple Macintosh machines at the Canterbury Education Centre.
1. Willingness of contributors to donate their original work to the centre without receiving royalty or ex gratia payments. The provision of complimentary copies and meticulous care to acknowledge the compilers' work is, of course, essential. When there is a group of writers from the same class, some form of 'syndication' can usually be arranged, so that the centre can provide free copies of resource units to all participants.

Staffing

If a resource production centre serves a state or national market it can be operated as a mail-order business with only limited 'across the counter' transactions. This greatly reduces the cost of staffing. Regular opening times can be restricted to once or twice a week, with the clerical assistant employed on an hourly basis, adjusting her or his time according to the number of orders to be serviced.

DISCUSSION

Three questions quickly come to mind:

1. How can a resource production centre be successfully established?
2. How can a resource production centre be maintained in a sound professional and financial position?
3. Are there any threats to their continued operation?

Founding A Centre

Establishing a centre should not prove difficult provided that the general conditions listed earlier are met.
The initial needs are:

1. A keen director with some editing experience is prepared to assist, probably at first on an honorary, part-time basis.
2. A small loan can be negotiated to cover initial printing and setting up costs.
3. A room with adequate shelving and bench space is available.

Maintaining A Centre

Maintaining a centre in 'good running order' has been found to be helped by:

1. Issuing an annual catalogue and order form early in the academic year and supplementing it with newsletters as new publications appear.
2. Ensuring there are at least 6 new publications annually, as these are the items which generally sell best. They should be clearly asterisked in the catalogue.
3. Analyzing stock-taking to identify the items best dropped from the catalogue. See Table 1.
4. Building up a reserve fund sufficiently large to 'cushion' any cash-flow problems which may develop as sales run down towards the end of an academic year.
5. Maintaining the quality of publication. Chances to take advantage of publications linked with special projects or courses should always be followed up.

Where a resource production centre is run within a teacher-training institution there should be little difficulty with maintaining a supply of useful resource units, as guidance in their preparation should be a vital part of any geographical education course. Publication then becomes a useful reward for the units assessed as worth sharing with other teachers. A wide choice of attractively useful topics must be available, also opportunities for a special topic to be approved where a trainee has specialist knowledge. This may be the result of work on a thesis or dissertation.

A Friendly Challenge or a Real Threat?

Nearly a decade ago, following local initiatives, New Zealand's first 3 education centres were established as a pilot scheme. Subsequently each developed its role so well that in 1986 another six centres were set up. Each is staffed with a director (a teacher on a 2-year secondment), a technician and a secretary, all employed full-time with Department of Education funding.

As explained earlier in this paper, where education and resource production centres are located near each other, they can initiate joint projects. On the other hand, where an education centre begins to produce free materials which could have been published by a production centre, the latter's market is reduced and economies of scale in production runs are lost. The downturn in business can quickly restrict the funds for new publications. Fortunately there are various solutions at hand, the easiest being closer, more positive links between the two centres.

CONCLUSIONS

Classroom teachers have to cope with all sorts of pressures, some curricular, some resulting from out-of-date societal perceptions of their responsibilities and yet others from their students' needs and demands. Unless they adopt a team approach to planning students' learning activities, their work load can become overwhelming. For this reason the sharing of materials amongst colleagues, both within a school and in the wider educational community, through such agencies as resource production centres, becomes most worthwhile. This is particularly so for a subject field like geography, with information needing regular up-dating.

There is no doubt that resource production centres can assist curriculum development. They offer a suitable outlet for the publication of 'pilot' units and activities during the early stages in a curriculum proposal. Subsequently they can continue producing a wide range of non-book materials and resource units to help consolidate the change.

ASSESSMENT LED CURRICULUM DEVELOPMENT IN GEOGRAPHY: A CASE STUDY FROM HONG KONG

Philip Stimpson

ABSTRACT

Examinations both constrain and encourage curriculum improvement. In less developed countries, where there is limited curriculum choice and curriculum development is lengthy, examinations offer annual opportunities to influence what is taught; hence the notion of assessment led curriculum development. In Hong Kong, failure to reform examination questions frustrated attempts at A level and examples of recent questions designed to meet the problem and encourage inquiry learning are given. Success with this strategy is dependent upon training of examination personnel and effective communication of intentions to teachers.

INTRODUCTION

The 1980s have seen a change in direction for curriculum development in many countries which is likely to continue well into the 1990s. In the 1970s curriculum development was rooted in projects abetted by teacher initiatives in schools but concern for accountability is likely to emphasise the notion of assessment led development, such a situation having long been present in many less developed countries. This concept reflects a process whereby assessment is used as an element in developing what is taught in schools and how it is taught The paper discusses the background to this with particular reference to less developed countries, and examines the case of assessment led development in Hong Kong.

THE POSITIVE AND NEGATIVE ASPECTS OF ASSESSMENT

The influence of examinations on the curriculum arouses conflicting reactions (Hall, 1975; Crossley and Guthrie, 1987) . On the one hand , examinations are seen as preventing curriculum improvement, adverse comment being focused on the effects of the 'diploma disease' (Dore, 1976) in which education is equated with qualification earning. This is a major problem in less developed countries (Bray, 1985) where certificates are the basis of occupational and social selection. Hence education becomes certification driven and geography classes become directed soley towards examination preparation. On the other hand, where there is a more pragmatic concern with chalkface activities the motivating effects of assessment are stressed, examinations being 'carrots' to attract and reward. The issue is to create better assessment and hence encourage good classroom practice.

ASSESSMENT LED CURRICULUM DEVELOPMENT

The pressures on geography teachers for accountability and for the attainment of performance levels by pupils emphasise the role of examinations in what is taught in the geography classroom. It is possibly utopian to think otherwise and, for example, many geography projects in Britain during the '70s involved examination reform (see, for example, the Geography 14-18 Project, Reynolds 1971). The assessment dimension facilitated implementation and legitimised curriculum reform within the conservative middle ground of geography teachers.

The constraints on curriculum reform are largely the same irrespective of the education system, the issue being one of degree. Curriculum changes come about through the interaction of the curriculum per se (and its component elements of content, method and assessment), teacher professionalism and the organisation/management system. Together these form the curriculum development environment. Changes in Europe and Australia in the 1970s were marked by a wide range of initiatives which were often school based. Experiment was an essential element, successful often small scale projects being elaborated for wider dissemination depending upon their appeal. For example, the modular format and focus on decision making in Geography 16-19 were not accepted by all teachers but the environment was such that those favouring the approach could continue with it, resulting in its present position of popularity.

In most less developed countries education systems are more highly centralised. Frequently there is only one syllabus per age group and tests are prescribed in a top-down expert controlled manner. The capacity to experiment is restricted, if not by regulation, then by teacher perception of the schooling system. Admitedly there are also elements of central control in countries such as the USA and UK but the school climate in which control is exerted is different. None the less, a trend is present in many countries towards limited curriculum alternatives and centralisation.

Curriculum change is a lengthy process. The period from informal indications of the shortcomings in existing teaching to implementating change may take six to ten years; for example, in Hong Kong, recent minor modifications at A level took over four years to introduce. Moreover, once changes are made there follows a period whilst the effects are digested and discussion of further development is unwelcome such is the inertia within educational systems. Whilst this is as true in developed as developing countries, the multiple initiatives, started at various times, which often characterise the former, result in development within one group of teachers if not another, whereas in less developed countries the same can rarely be said because of central control and hence development is constrained.

Examinations in contrast are generally constructed annualy providing the opportunity to encourage curriculum development at the classroom level. Examinations offer a means of communicating change to schools at a practical level which is of particular significance to the middle ground of geography teachers. These teachers are usually successful in what they do but are reluctant to change,inspite of new curriculum requirements,unless suitably motivated. They tend to be pragmatic and have short term teaching aims, their role being seen in classroom terms and in terms of pupil achievement; hence the importance of examinations as change agents.

The major area of change is frequently from product to process, but process based curricula are generally slow to be accepted. This is particularly so in less developed countries where models of the "educated person" are based on knowledge acquisition; this is a difficult concept to break and the out come in assessment terms is examinations which stress the recall of places, features and ideas in a mechanical manner. At the same time there is the need to improve the problem solving and communication skills of young people and to develop a respect for their environments.

CURRICULUM DEVELOPMENT IN HONG KONG

1. The need for examination reform

In this section the influence of examination reform on curriculum development is discussed in the context of the Hong Kong A level examination. The A level is taken after seven years of secondary schooling and was developed as a matriculation test for university entrance although it now has wider value for entry into professions. During the late 1970s it closely followed the pre-1976 University of London A level from which it was derived. and was a variation of the systemmatic scope model with a large element of regional geography. Because of mounting dissatisfaction, it was revised in 1981, introducing key ideas of Landscape, Ecosystem and Man-environment, and integrating systemmatic elements of physical geography and human geography within a framework of landscapes of differing degrees of human impact. The focus on landscape was intended encourage relevance, reality and an inductive approach and was important because the curriculum included for the first time spatial organisation ideas, raising fears that teaching might become too theoretical. Significantly the objectives were given in behavioural terms stressing cognitve skills reflecting an emphasis on process.

The changes in paradigm, their complexity and the absence of sustained support resulted in its introduction being greeted with misgivings; the more radical changes are prominent by their absence. The content as taught does reflect a combination of ecosystem and spatial organisation ideas, the text books used have seen to this. However the process elements, which the content was supposed to facilitate, have largely been ignored. Hence the curriculum change, as in so many instances, affected developments in what is taught but had little influence on how it was taught. The approach of teachers was still mainly one of information transfer although now it was sytemmatic rather than regional knowledge.

This can partly be understood by looking at the examinations which preceeded and followed the introduction of the 1981 Curriculum. The pre-1981 curr iculum was examined in a traditional three paper system comprising a physical geography essay paper, a regionally framed human geography paper and a practical paper. Essays were typically of the form "Explain the settlement pattern of EITHER Luzon OR Taiwan" or "Write a brief explanatory account of three of the following : (a)............" (HKEA, 1980). The main directive terms used in the papers were: "write an explanatory account", "give a geographical account", "to what extent", (with refer ence to a photograph) "identify and explain", "briefly explain", "examine pattern and factors", "describe", "discuss", "explain", "write an essay on" and "what... how...". It is clear that most questions could be answered by recall.

How different were the questions testing the 1981 Curriculum which professed process objectives? The assessment system was now composed of only two papers, a structured answer paper and an essay paper. A typical question on the first contained a diagram illustrating a general manufacturing process in which four inputs and two outputs were not specified. The following questions were asked:

(a) What are the inputs in the manufacturing process? (2 marks)

(b) What are the outputs in the manufacturing process? (2 marks)

(c) Discuss briefly, with examples, the effects of transportation on the location of manufacturing plants. (4 marks)

(d) Discuss briefly, with examples, the effects of the level of technology on the combination of inputs in the manufacturing process (4 marks)

(e) Define capital intensive industry (2 marks)

(f) Define labour intensive industry (2 marks) (HKEA, 1983)

The question focuses on economic aspects but similar examples are found from physical geography. For example, a soil profile description was given in tabular form or a diagram illustrating zonation of vegetation provided, both being followed by similar questions to that above. In comparison with the earlier questions, instructionsare more precise and reliability in marking is improved, but little was added to what was demanded previously. The emphasis was still on recall although a few questions contained elements which required manipulation of data; for example, students calculated the break point from Reilly's formula using data provided. In most cases, however, the data acted only as a context for recall rather than as working materials. This was a particular deficiency given the curriculum objectives and the lack of a practical paper, the questions reinforcing the information transfer mode of teaching.

Essay questions in the second paper were intended to test higher order cognitive skills but bore a marked similarity to those in the earlier examination. For example, students were asked to "Discuss the effects of public and private housing developments on residential mobility in a city of your choice". Commonly used directive terms included: "compare and contrast", "discuss effects of", "discuss importance of..", "assess ecological impacts of...", "point out merits and limitations of...", "explain", "discuss" and "expand statement". The terms are a step forward as relationships are stressed explicitly and attention is seemigly given to evaluation. However, indications from the marking of the papers suggested that emphasis was given to recall of factual information rather than to the establishment of the relationships or to assessing powers of argument. Moreover it is probable that the relationships examined had already been discussed in classes.

2. Changes in examination questions

Recently efforts have been made to improve the validity of questions. For example, the structured questions were directed towards data extraction and explanation, data being provided in the form of oblique or vertical air photographs, O.S. maps, schematic maps, graphs, tables and short pieces of text. The questions were structured within a WHAT, WHERE, WHY framework to encourage inquiry learning. For example, in a question concerning agricultural landscapes, students were provided with photographs of polderlands and were asked:

(a) What are the distinctive features, other than settlement, of the agricultural landscape?

(b) 1. Describe the settlement pattern

2. What are the social and economic advantages of such a pattern?

(c) What evidence suggests that this area has been recently planned?

(d) What can be implied from the photograph concerning land quality and land value? (HKEA, 1986)

Elsewhere on the same paper students examined a air photograph of an Asian city in 1976, a sketch map of the same area in 1896 and a brief history of the city, and were asked to:

(a) Mark the following features on the sketch map

(i) the boundary of the built up area of the city in 1896

(ii) the prison

(iii) the area of land reclaimed since 1896

(iv) two recreational facilities available in 1976

(b) Using evidence from the information give descriptions of the major changes which have occured since 1896

(i) changes in land use

(ii) changes in the transport network (HKEA, 1986)

Questions on the essay paper were written to ensure that instructions were explicit and to include supplementary evaluatory elements. Typical questions in 1986 were: "Discuss the problems posed by the effects of climatic variability on farming in an area of your choice. Evaluate any three different means that have been used to cope with these problems", and "Discuss the influence of climate on weathering and soil formation in the desert lands cape. Assess the relative importance of this factor".

Some progress has, therefore, been made towards testing skills and emphasising a more active approach within the examination questions; hopefully this is trasferred to the classroom. The next stage is to include questions of a decision making nature. Such a proposal was deferred when the curriculum was modified in 1986 as teachers felt uncomfortable with the change. However there are indications that a step by step approach is being taken to introduce these ideas as decision making elements are now being included within other test items.

DISCUSSION

The reforms described are in themselves nothing radical, similar questions being found elsewhere; their significance rests in the acceptance that examinations have a role, albeit obliquely, in leading and preparing the way for curriculum change. These initiatives are unlikely to be successful unless supported elsewhere in the system.

Given inevitable turn-over in examination personnel it is important that the added role of curriculum responsibility is understood by setters and markers. Markers, particularly in less developed countries, tend to feel more secure with point-marking of factual content. On the other hand, encouragment of creative thinking requires examination of process in open-ended situations. The problem is not usually one of ability but rather of priorities. Hence education of personnel is vital if the job is to be carried out within the spirit of the curriculum.

Effective dialogue between teachers and examiners and a collaborative attitude to assessment is needed. Regular meetings in schools are vital. Whereas in the UK and Australia school based assessment has been common place for nearly two decades, in most less developed countries assessment is not considered a matter of classroom responsibility. If there is not common purpose and understanding of the problems each face, little progress will be made.

Finally examinations can become as moribund as the worst curricula. If the examinations are to be involved in the development task then it is incumbent upon them to experiment; perhaps each year there should be at least 10% of questions breaking new ground either with respect to content or skills.

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ENVIRONMENTAL EDUCATION IN THE SOUTH PACIFIC

Neva Wendt

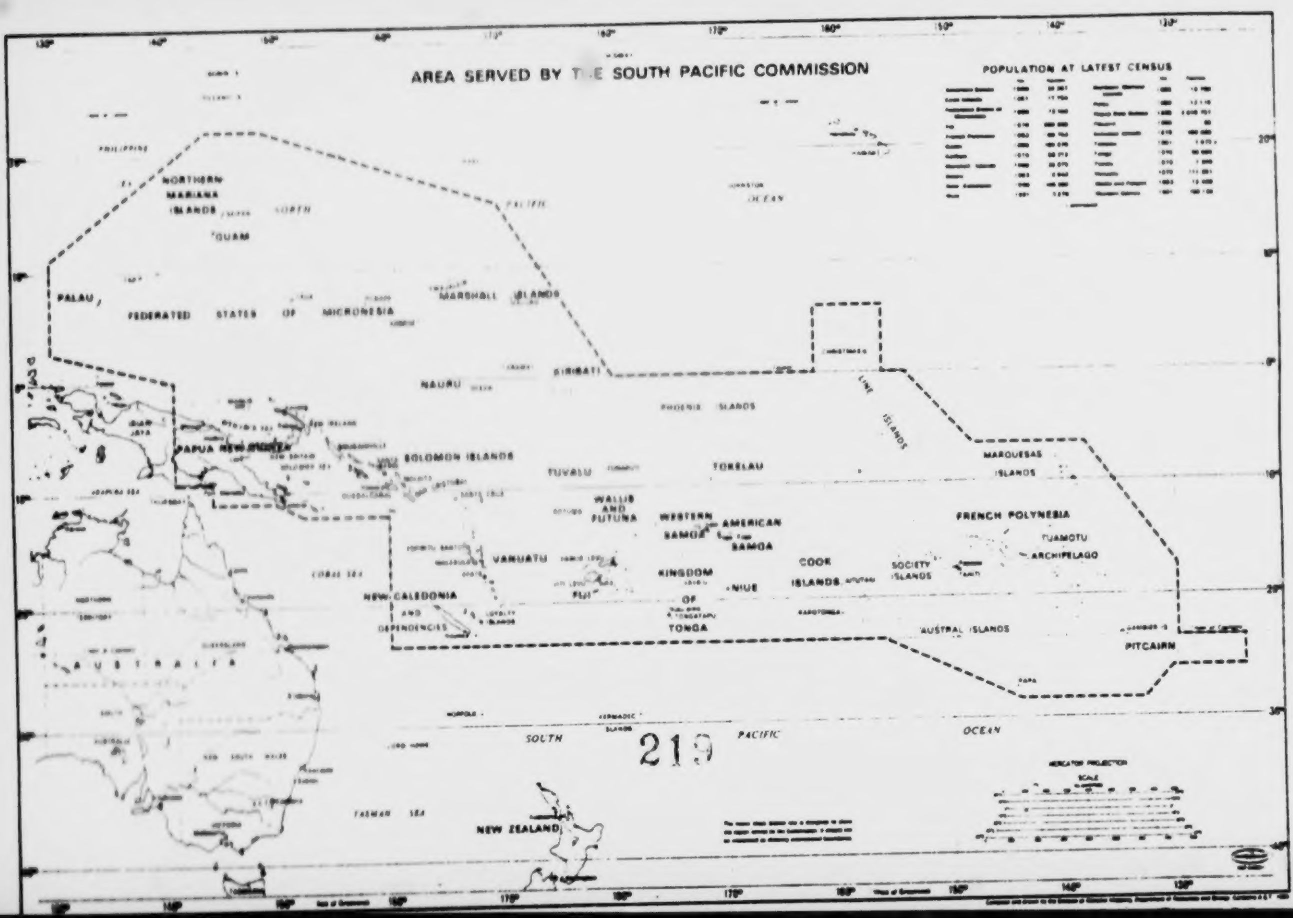
Abstract

Faced with the opportunity to incorporate environmental content into the new education systems of the South Pacific Islands which are currently evolving from their past colonial educational heritage, the South Pacific Regional Environment Programme (SPREP), has developed materials of region-wide relevance to cater for the needs of the education departments of the 22 island countries and territories of the South Pacific. This paper outlines the complexities of attempting to ensure that environmental content has established a strong foothold at a crucial developmental stage in the curricula of these countries which all have specific common content requirements based on their geographical characteristics as small island environments but, at the same time, have a vast diversity of education levels, culture and language which complicate these attempts to educate on a regional basis.

Introduction

As the title of this paper suggests, the content is 'Environmental', rather than strictly 'Geographical' Education. However, in the South Pacific Region, much of what is regarded as environmental education encompasses an understanding of the physical features and ecological concepts present in the Pacific Islands, together with the impact of man's activities on these environments and as such 'environmental education' quite naturally finds a niche in the subject area of the Geographer. In fact, the multi-disciplinary nature of environmental education results in it being housed in a diversity of subject areas such as Biology, Geography, Physics, Community Studies - to name a few, with attempts being made to integrate material of an ecological nature wherever possible in other subject areas of the region's education systems.

The South Pacific Regional Environment Programme (SPREP) undertakes work on behalf of the 22 island countries and territories of the South Pacific Region - a vast region containing five million people scattered over an area of thirty million square kilometres, less than 2% of which is land, the remainder being, of course, the Pacific Ocean. The 'sharing' of an ocean is one feature that has given to most of the islands of high degree of ecological commonality and has thus enabled our programme, SPREP, to take a regional approach in facilitating environmental protection and education activities. The small size of many of the countries, some of which only have a few hundred school-aged children, has also made a regional approach initially more viable for our education activities due to the difficulty of providing tailor-made material on a short-run basis. But, the vastness of the area, encompassing so many countries and territories, namely, American Samoa, Cook Islands, Federated States of Micronesia, Fiji, French Polynesia, Guam, Kiribati, Marshall Islands, Nauru, New Caledonia, Niue, Northern Mariana Islands, Palau, Papua New Guinea, Pitcairn, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu, Wallis and Futuna, and Western Samoa, (See Regional Map, Fig. 1), means



AREA SERVED BY THE SOUTH PACIFIC COMMISSION

POPULATION AT LATEST CENSUS
PHILIPPINES
NORTHERN
MARIANA
ISLANDS
GUAM
NORTH
PACIFIC
OCEAN
PALAU
FEDERATED STATES OF MICRONESIA
MARSHALL ISLANDS
NAURU
KIRIBATI
PHOENIX ISLANDS
LINE ISLANDS
MARQUESAS ISLANDS
IRIAN JAYA
PAPUA NEW GUINEA
SOLOMON ISLANDS
TUVALU
TOKELAU
WALLIS AND FUTUNA
WESTERN SAMOA
AMERICAN SAMOA
FRENCH POLYNESIA
TUAMOTU ARCHIPELAGO
CORAL SEA
VANUATU
NEW CALEDONIA AND DEPENDENCIES
FIJI
KINGDOM OF TONGA
NIUE
COOK ISLANDS
SOCIETY ISLANDS
AUSTRAL ISLANDS
PITCAIRN
AUSTRALIA
NEW SOUTH WALES
SOUTH
PACIFIC
OCEAN
TASMAN SEA
NEW ZEALAND
MERCATOR PROJECTION
SCALE
130°
140°
150°
160°
170°
180°
170°
160°
150°
140°
130°
20°
10°
0°
10°
20°
30°
40°

FIGURE 1

that there is a wide language and cultural diversity, together with vastly differing educational levels, within the three major groupings of Melanesia, Micronesia and Polynesia. Thus, when undertaking environmental education on a regional basis as a means of quickly filling a material-void and establishing a foothold for environmental content among the many competing disciplines in newly developing education systems, one begins with a common regional subject matter but also a diverse set of characteristics which complicate these efforts to educate on a regional basis. Yet timing is crucial because many countries, on attaining independence, are shedding their colonial educational heritage, reorienting and establishing their own education systems. Thus, a regional approach has been the only way to ensure, when working for 22 separate countries, that the opportunity to incorporate material is not lost before these education systems become established, less flexible and less willing to include additional curricula, particularly of such a multi-disciplinary nature. Once the initial foothold has been established, it will be more appropriate to provide specific country, rather than regional, support in the future.

Main Text

Education was identified as one of the priority activities when SPREP was designated, by the governments of the region in 1982, as the major intergovernmental Environment Programme of the South Pacific and since that time, its education mandate has been further and substantially strengthened. A decade after the first worldwide environmental meeting in Stockholm (1972) had heralded the message that environmental protection was too important to be tackled in a piecemeal fashion, the governments of the South Pacific put together an Action Plan to ensure their region was also involved in the co-operative global environmental effort envisaged by the United Nations. Meeting at Rarotonga in the Cook Islands at the Conference on the Human Environment (1982), South Pacific governments identified existing and potential environmental problems, and formulated a Plan of Action outlining future activities to be undertaken to ensure environmentally sound planning and management *specifically suited to the needs and conditions of the countries and people in the region* and to enhance their own environmental capabilities. The governments agreed that a South Pacific Regional Environment Programme (SPREP) be established to implement the Action Plan and that the programme be co-ordinated by the two major international organisations in the region, the South Pacific Commission (SPC) and the South Pacific Bureau for Economic Co-operation (SPEC), together with the Economic and Social Commission for Asia and the Pacific (ESCAP) and the United Nations Environment Programme (UNEP) - the South Pacific forming one of UNEP's twelve Regional Seas Programmes. SPREP is answerable to the governments of the region and funded by two major sources: International organisations, of which UNEP is the major contributor, and from voluntary country contributions by the region's member governments. The South Pacific governments and administrations thus have a very direct input into environmental activities undertaken by the programme - from the very early times when they first identified their region's problems, to the adoption of the Action Plan and the establishment of, and continued guidance to SPREP.

Three years after the programme's implementation phase had commenced, when the work of SPREP was evaluated in 1985, the governments stressed their desire for an even greater share of funding to be allocated specifically to education whilst, at the same time, the United Nations Environment Programme's Governing Council, meeting in Nairobi, also called for a strengthening in programmes of environmental education. Thus, SPREP has received a firm mandate and strengthened financial support to assist South Pacific countries in incorporating environmental content into school curricula.

Education, of a nature appropriate to the region, was foreseen as a principle tool in implementing activities to ensure continued protection and enhancement of the environment of the South Pacific. At the inception of SPREP the governments stated that:

> "throughout the education system, through primary, secondary, and tertiary institutions and in the various media for public information and education, there is need for the provision of relevant basic material such as teaching aids. There is widespread concern expressed that much of the present teaching material is irrelevant to the island environment..."(1)

Concern was expressed that many countries in the region were tied into inappropriate education systems that stressed large-scale urban-industrial development and large-scale technically-oriented agricultural undertakings with little emphasis on traditional resource-use systems, many of which provide valuable guides for sound environmental protection practices. Many of the school texts of the more technically developed neighbouring countries on either side of the Pacific that were at that time being used, stressed problems almost completely absent from many parts of the region, for example industrial development and smog from vehicle exhausts, and totally neglected those issues of major concern to the South Pacific, such as the physical characteristics and resources of coral reefs.

Thus, as countries have started to move away and develop their own education systems, there has been a major shift in emphasis and a concern to develop material specifically relevant to the region. The common environmental problems of the South Pacific, and one's which form the subject of education curricula include soil erosion; damage caused by mineral extraction; non-availability of fresh water; loss of forests; coastal zone land use conflicts, particularly threats to mangroves; damage to reefs and lagoons; waste diposal; use and disposal of toxic chemicals, particularly pesticides; and last, but certainly not least, is the one problem that more than any other has united countries in a regional approach to the environment - the issue of Radioactivity. Particular concern has been expressed not only about the effects of nuclear testing in the region but also about proposals to dump radioactive waste in the Pacific Ocean.

Whilst some of these subjects are common to both South Pacific and neighbouring developed countries, the emphasis often varies. For instance, the study of the physical characteristics and means for protection of mangroves is important to both but, to Pacific Islanders, it is because mangroves have traditionally provided major sources of food, medicinal plants, building material, fuelwood and protection of the land from wave damage; a different emphasis to the role played by mangroves in developed countries. The study of cyclones, of little import in curricula produced in developed countries, has significant educational value for Pacific Islands. Man's impact on his environment through activities such as waste disposal by landfill method on islands with limited land resources becomes an important area of study because of the potential problem for contamination of scarce drinking water supplies - a rare occurrence in the larger neighbouring countries. Coral Reef study and emphasis on its protection also becomes a viable subject area for the educator because of the reef's role as a valuable supplier of food (many islands being particularly marine-dependent because of their limited land supplies), the reef's role as protective buffer to waves and not least, as a tourist attraction on which the economies of many countries are increasingly dependent. The studies then, of geographical characteristics and ecological concepts and of environmental pollution and its social costs present in "imported" education models are not necessarily the most appropriate for small, relatively isolated coral atolls.

Thus, it has been necessary to develop materials with a specific South Pacific "island" flavour, an activity embraced by the South Pacific Regional Environment Programme (SPREP). Initially, the concentration has been on production of region-wide fact sheets on Coral Reefs, Soil Erosion, Pesticides, Forests and Conservation with supporting audio-visual material which highlights the landform, climatic characteristics and potential land-use threats to the island environment. Region-wide material highlighting case studies of specific instances of environmental degradation, such as the effects of Nickel Mining in New Caledonia; the effects of Phosphate Mining in Nauru, Banaba and Makatea; the effects of Cyclones; the impact of increased Urban Development on small islands; and the effects of Gold Mining in Papua New Guinea all form valuable resource material of direct relevance to the South Pacific.

Education budgets in most countries of the region, rarely stretch to an allocation for purchase of materials; the burden for even the most rudimentary equipment usually falling to the individual "enthusiastic" teacher who often provides extra materials from his/her own meagre salary. Hence the material of a regional nature produced by SPREP, and provided freely to countries, is eagerly accepted and serves to fill a definite materials void.

Adaptation of Regional Material for specific country needs is encouraged and forms the next step in ensuring relevancy of curricula, necessitating simplicity of text as a goal to be strived for in the production of SPREP's material. Not only does this enable wider acceptance, given the vastly different education levels in the region, but it facilitates translation into local languages - an important step for best acceptance, particularly at the primary school level. This has been undertaken specifically with audio-visual material where it is considered most beneficial for children to listen in their mother tongue. Even where interpretation is not involved, the English or French text is recorded with a Pacific Island voice, far more appropriate than the intonation of the larger neighbouring countries.

In-country support

Having initially filled a gap in curricula, SPREP is now moving towards specific in-country support, working initially with curriculum developers and teachers at a regional workshop, held in July 1988 at which the idea of incorporation of further environmental education material was seeded, examples of existing country material evaluated, discussion undertaken regarding proposed teaching mechanisms and ideas shared between country participants for future curricula development. SPREP has now established a direct country support project to enable in-country preparation, with financial assistance from SPREP, of material specific to the requirements of each individual country and developed, where skills exist, by the country's education department. Where skills are not available, consultants are provided to work alongside the person in-country providing the dual benefit of ensuring relevancy, together with the provision of training in future material preparation.

Discussion

Briefly stated above are our programme's efforts to ensure the existence of relevant studies of the environment in the curricula of South Pacific island countries. These efforts, which have been undertaken at a crucial developmental stage in the evolving education systems in the region, have had to be cognizant of a number of factors, namely:

1. The value of traditional island knowledge has become very widely accepted worldwide necessitating sifting out and blending the best of both traditional and scientific knowledge for incorporation into school curricula. Schools in some parts of the world are closed to participation from the non-professional sphere. However in the South Pacific a rich source of traditional knowledge, eagerly accepted by children is that of village elders.

2. In many South Pacific countries, students may be proficient in several languages of which neither English nor French are their major ones. Thus material has needed to be simply written to allow ease of translation and to account for variations in educational levels and differing English/French language skills.

3. Material with a highly diagrammatic/pictorial content is considered most appropriate due to the existing lack of available visual material in the region; material needs to be in a ready-to-use format, teachers often not having the facilities to piece together from other sources and, of course, photocopiers are almost non-existent in most schools.

4. A problem-solving approach with a high degree of learner interaction rather than a factual learning approach, is considered a more viable and culturally

relevant form of teaching environmental concepts in the region.

5. Audio-visual material in a suitable format (bearing in mind that not all schools have electricity) is universally appreciated, particularly in the many countries where TV is non-existent;

6. Expertise in curricula development skills from neighbouring developed countries is essential for the region but such assistance must be sensitive to the need to integrate the specific requirements of the island country environments and thus ensure that curricula reflect South Pacific "reality" rather than abstract education concepts from more industrially/technically developed parts of the world.

7. Cultural and language diversity can be broad even in different islands within the same country group, necessitating a degree of flexibility on the part of the curricula developers.

8. Teachers are often learning about their environment as they are teaching it, thus teacher training workshops (of both a pre- and in-service nature) are considered most desirable as future activities for the region.

Conclusion

If the aim of education is to acquire knowledge and skills and to put them to use in bettering one's way of life, then the very basic requirement for curricula is that they are relevant to the needs of the target population. In the South Pacific Region, education in geography must then look at the physical characteristics of man's impact on small, isolated, ocean-dominated islands whose people have successfully maintained strong traditional ties to their land and way of life, such activities having enabled them to live consistently in harmony with nature. Educators must look to traditional knowledge as a foundation on which to build an education system and only incorporate the most appropriate technically-oriented aspects of "imported" education models. Particularly in environmental education there is fertile ground to be explored in traditional environmental protection measures. As well there is a valuable opportunity for curricula developers from neighbouring developed countries who have expertise in their field, together with a degree of flexibility and sensivity to the region's needs, to assist the South Pacific Regional Environment Programme (SPREP) in curriculum development work.

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Research in geographical education

THE SHIFTING CENTRES OF A CURRICULUM INNOVATION

David Boardman

ABSTRACT

Geography for the Young School Leaver is generally regarded as one of the most successful English curriculum development projects. The initial use of the centre-periphery model in the dissemination of the project was followed by a strategy which ensured a proliferation of centres. At the local level, however, patterns of shifting centres emerged within the boundaries of local education authorities; project schools appeared and disappeared, often to be replaced by others. This paper illustrates the processes by means of a study of the dissemination of the project in Birmingham over a period of twelve years.

INTRODUCTION

The Geography for the Young School Leaver (GYSL) or Avery Hill Project occupies a unique place in English curriculum development. The vigour of the project's dissemination strategy led Stenhouse (1980) to conclude that in terms of adoption GYSL was the most successful of all Schools Council projects. By 1988 GYSL had received continuous central financial support, first from the Schools Council and then from the Secondary Examinations Council, for a period of eighteen years. The history of the project at the national level and its impact on geographical education during this period have been documented elsewhere (Boardman, 1988). The focus of the present paper is on the way in which the project spread into schools at the local level.

GYSL dissemination strategy contained elements of all three models of diffusion postulated by Schon (1971). At the national level the project began by using the 'centre-periphery' model. The nature of the teaching materials and structure of the examination courses for pupils in the 14-16 age range have been described elsewhere (Boardman, 1985). The use of the 'proliferation of centres' model started with the appointment of a team of regional co-ordinators and the organization of regional training courses in 1973-74. The co-ordinators helped teachers to negotiate syllabuses and schemes of assessment based on GYSL leading to the Certificate of Secondary Education (CSE) awarded by the regional examinations boards. They also became regional consultative moderators for the national Avery Hill General Certificate in Education (GCE) Ordinary Level examination. The regional co-ordinators subsequently played a similar role when the Avery Hill joint GCE/CSE courses began in 1984 and again when courses leading to the General Certificate of Secondary Education (GCSE) were introduced in 1986.

At the local level the national project and regional co-ordinators offered their support but respected the freedom of individual schools to adopt or reject the project. The result was that patterns of 'shifting centres' emerged within local education authority (LEA) boundaries. The precise nature of this process has received little attention yet it helps to explain how the curriculum changes in a decentralised educational system like that of England. The dissemination of GYSL in the Birmingham LEA has been studied by the writer from the start of the first CSE courses based on the project in 1974 to the start of the first GCSE courses in 1986. The sequence described in the text which follows is shown spatially on maps (Figures 1-4).

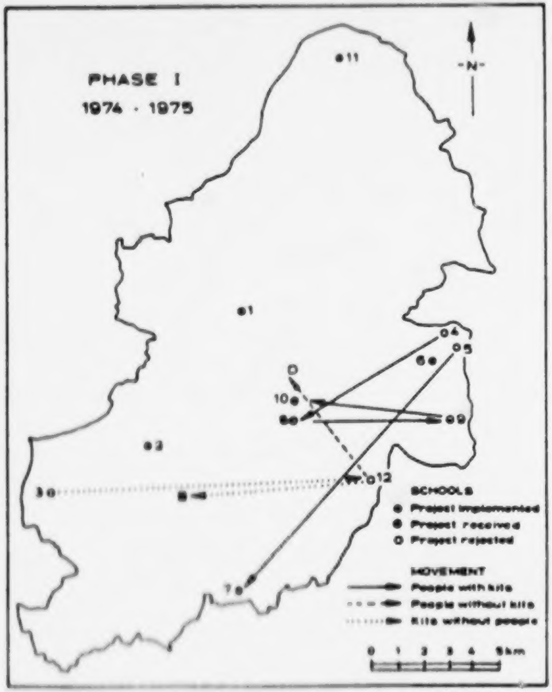
PHASE I
1974 - 1975
N
11
1
4
5
6
D
10
8
9
2
12
3
B
7
SCHOOLS
● Project implemented
● Project received
○ Project rejected
MOVEMENT
People with kits
People without kits
Kits without people
0 1 2 3 4 5km

Figure 1

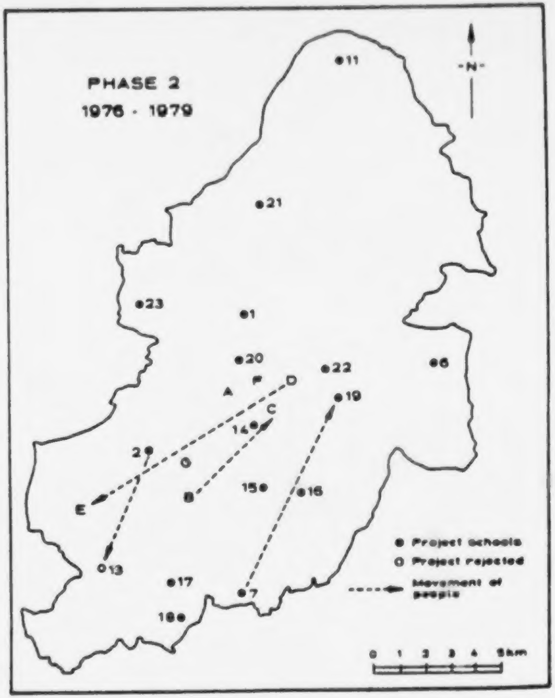
PHASE 2
1976 - 1979
N
11
21
23
1
20
22
6
A
F
D
C
19
14
2
G
E
B
15
16
13
17
7
18
● Project schools
○ Project rejected
Movement of people
0 1 2 3 4 5km

Figure 2

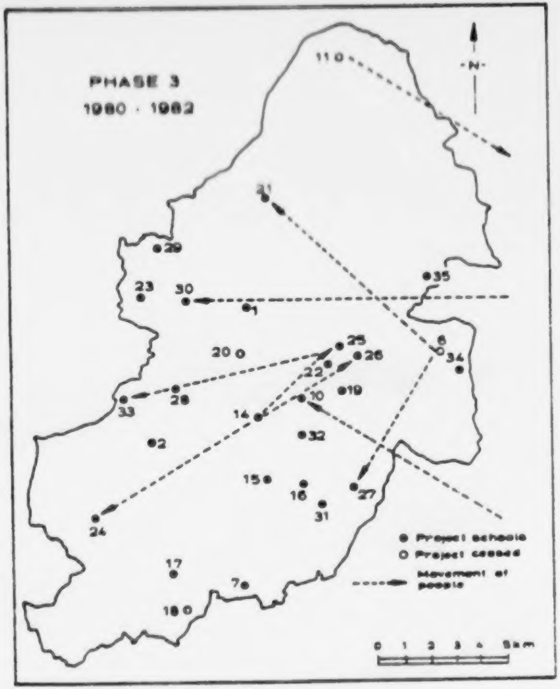
PHASE 3
1980 - 1982
N
11
21
29
23
30
1
35
20
25
26
22
8
34
33
28
10
19
14
2
32
15
16
27
31
24
17
7
18
Project schools
Project ceased
Movement of people
0 1 2 3 4 5km

Figure 3

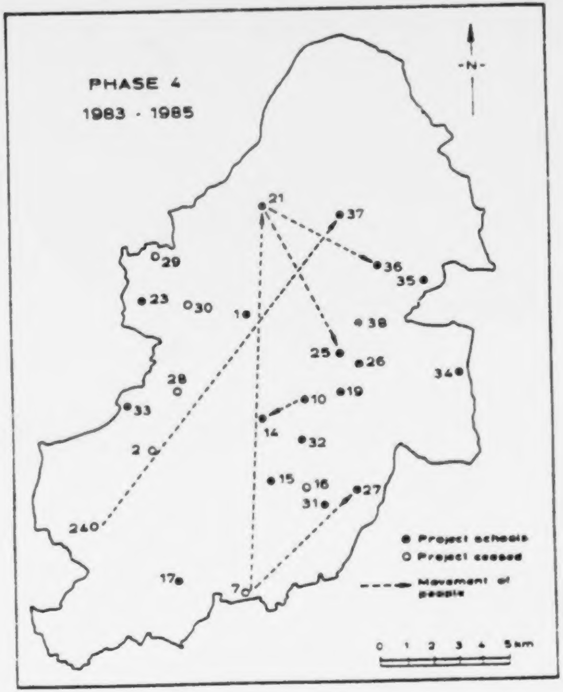
PHASE 4
1983 - 1985
N
21
37
29
36
35
23
30
1
38
25
26
28
34
19
10
33
14
32
2
15
16
27
31
24
17
7
Project schools
Project ceased
Movement of people
0 1 2 3 4 5km

Figure 4

THE FOUR PHASES

Phase 1: Trialling (1974-75)

The geography adviser in the Birmingham LEA invited a teacher from each of six schools (1-6 in Figure 1) to attend the regional training course held in April 1974 and purchased the kits of project teaching materials for them. In the following Autumn three schools (1, 2 and 6) started to teach the first CSE course based on the project. In two schools (4 and 5) the staff teaching GYSL moved to senior posts in other schools (7 and 8) in 1975, taking the project kits with them. The project was implemented in school 7 but not in school 8, which closed a year later. Staff and pupils spent a year in temporary premises (9) before moving into a new building (10).

A teacher at another school (11) started to teach the project after purchasing the kits independently. The project was rejected by school 3 and the kits were transferred to another school (12), but before a GYSL course could begin there the teacher moved to a post in a college of education (D) where the regional co-ordinator worked. The kits were subsequently transferred to an urban base or resources centre (B). During the trial phase, therefore, GYSL was successfully implemented as a CSE course in five of the twelve schools mentioned (1, 2, 6, 7 and 11).

Phase 2: Take-off (1976-79)

Early in 1976 the Birmingham LEA appointed an advisory teacher to assist the geography adviser at the education office in the city centre (A in Figure 2) and develop the urban base (B). The advisory teacher and urban base were subsequently transferred to a teachers' centre (C) located in a former college of education which had closed. Later in 1976 the college of education (D) where the regional co-ordinator worked was scheduled for closure and he moved to a post in another college (E). The geography adviser organized a half-day conference at a teachers' centre (F) in April 1976 in order to disseminate GYSL to other schools in the city. After a year's secondment to take a course at the university (G) the teacher at school 2 became deputy head of another school (13) but the project was not adopted there.

The syllabus for the national Avery Hill GCE O-level course was published in 1976. This encouraged three schools to adopt GYSL as both a CSE and GCE course: school 14 in 1976, and schools 15 and 17 in the following year. Between 1977 and 1979 GYSL was introduced as a CSE course at another seven schools: 16, 18, 19, 20, 21, 22 and 23. During phase 2, therefore, ten new schools joined the original five which had implemented GYSL in phase 1. There was a noticeable concentration of GYSI schools in the southern half of the city (Figure 2).

Phase 3: Expansion (1980-82)

Revision of the CSE course in 1980 was followed by an increase in the number of project schools, the adoption of GYSL sometimes following the arrival of new teachers. School 14 was particularly influential in disseminating GYSL in this way: in 1980 geography teachers moved to schools 24, 25 and 26, all of which implemented the project (Figure 3). One of the original GYSL schools (6) closed in 1980 and the two geography teachers moved to other posts, one at school 21, where the project was already being taught, and the other at school 27, where both the GCE and the CSE courses were implemented. Teachers who were appointed from outside the LEA introduced the CSE course into schools 10 and 30 in 1982, as did a teacher who moved from school 25 to school 33. Between 1980 and 1982 a further six schools (28, 29, 31, 32, 34 and 35) adopted GYSL as a CSE course on the initiative of the teachers working in them.

Meanwhile another of the original GYSL schools (11) ceased to teach the project when the teacher who had introduced it left to take up a post outside the city. The project ceased to be taught at one school (18) as a result of an internal staff decision, and another school (20) closed. The total number of schools teaching GYSL at the peak of its popularity in 1982, therefore, was 24. During phase 3 thirteen schools had joined the fifteen which were teaching the project at the end of phase 2, but in the same period four schools ceased to teach it.

Phase 4: Contraction (1983-85)

Secondary education in Birmingham was reorganized in 1983 to deal with the problem of vacant places resulting from falling numbers of pupils. Some schools closed and others amalgamated to form larger units. School 2, one of the original group of five schools which had implemented GYSL in 1974, closed in 1983 after pupil numbers had fallen sharply. The closure of school 6 in 1980 has already been noted. Its neighbouring schools 4 and 5 closed in 1985. This meant that only one of the original five GYSL schools was still open (1 in Figure 4).

Two geography teachers at school 7, where GYSL had been taught since 1975, moved to other project schools (21 and 27) in the 1983 reorganization. The newly appointed staff at school 7 lacked experience of GYSL and the project ceased to be taught there. The two geography teachers who had been teaching GYSL at school 21 both moved to other schools: one went to school 25, which had amalgamated with school 22, and the other went to another newly amalgamated school (36) in which GYSL had not previously been taught and introduced the project there.

GYSL was also adopted at another school (37) when a teacher moved to it from school 24. In the following year the project ceased at school 24.

In the Autumn of 1984 the national Avery Hill joint GCE/CSE syllabus was published and the teachers in ten schools decided to adopt it: schools 1, 10, 15, 17, 21, 27, 33, 34, 35 and 37. Only six schools continued to teach the group CSE course: schools 14, 19, 25, 30, 32 and 36. One school (26) withdrew from the group scheme and devised its own CSE.

All ten schools which adopted the joint GCE/CSE syllabus in 1984 continued to teach it to their new classes in 1985. They were joined by two schools (23 and 31) which had not taught the project in the previous year, and by another school (38) which was teaching it for the first time in 1985. Five schools remained members of the group CSE scheme in 1985; school 30 withdrew from it and school 26 continued with its own CSE. A total of 19 schools, therefore, were teaching GYSL or Avery Hill when the last CSE and GCE O-level courses began in 1985.

Effects of the GCSE (1986)

The introduction of GCSE courses in 1986 accelerated the contraction which had begun three years previously. The official Avery Hill GCSE syllabus was adopted by only eight schools in Birmingham. Four schools (10, 15, 21 and 33) had taught the Avery Hill joint GCE/CSE syllabus since 1984 and a fifth (38) had done so since 1985. Two schools (14 and 32) had been members of the group CSE scheme. School 37 closed in 1986 but the geography teacher adopted the Avery Hill GCSE syllabus upon moving to another school (39, not shown in Figure 4 but located between schools 27 and 32).

The official Avery Hill GCSE syllabus differed in several respects from the joint GCE/CSE syllabus which preceded it. Six former project schools (17, 19, 25, 27, 31 and 35) rejected the new syllabus and selected instead other GCSE syllabuses which more closely resembled the former Avery Hill joint GCE/CSE syllabus. Three schools (1, 23 and 26) chose other GCSE syllabuses and three (34, 36 and 37) closed.

DISCUSSION

Local Dissemination

If the three schools which rejected the project in the early years are excluded, GYSL was implemented in 35 schools in Birmingham at some stage between 1974 and 1985. In the Autumn term 1985, however, when the last GCE O-level and CSE courses began, the project was being taught in only 19 of these schools. In other words, it survived in just over half of them. When the first GCSE courses began in 1986 only eight schools were teaching the official Avery Hill syllabus.

The evidence provided by this study suggests that there were several factors which influenced the dissemination of the project and its subsequent implementation.

1. **Early adoption of the project.** Most of the teachers who implemented GYSL during the trial and take-off phases from 1974 to 1979 retained their commitment to the project and were still teaching it, not necessarily in the same schools, up to the time of secondary school reorganization in 1983 (schools 1, 6, 10, 14, 15, 16, 17, 19, 21, 22 and 23).

2. **The movement of teachers.** Teachers who moved to other schools after teaching GYSL often introduced the project into

their new schools if it was not already being taught there (schools 19, 21, 24, 25, 26, 27, 30, 33, 36 and 37).

3. **A common core course.** The availability of the national Avery Hill GCE O-level syllabus from 1976 influenced the decision to implement the project in four schools (14, 15, 17 and 27) as it enabled a common core course to be taught to all pupils. The publication of the Avery Hill joint GCE/CSE syllabus in 1984 was even more influential. It was adopted by the majority of schools which wished to retain their commitment to the project (schools 1, 10, 15, 17, 21, 27, 33, 34, 35 and 37 in 1984, together with 23 and 31 in 1985).

4. **The geographical location of schools.** At the end of the take-off phase in 1979 most GYSL schools were located in the southern part of the city (Figure 2). Although the north-south extent of the city of Birmingham is about 20 km, by the end of the contraction phase in 1985 most GYSL schools were located in the eastern section of a zone about 10 km wide running from NW to SE across the central part of the city (Figure 4). The southern limit of this zone is marked by a line joining schools 31 and 33, and the northern limit by a line parallel to it running through school 37.

The Shifting Centres

The shifting centres which emerged during the process of local dissemination were the result of the adoption of the project by new schools, as indicated above, and its discontinuation at other schools, for which there were several reasons:

1. **The closure of schools.** Although closure could not have been foreseen when GYSL was adopted, it brought the project to

an end at nine schools (2, 6, 8, 9, 20, 22, 34, 36 and 37).

2. **Late adoption of the project.** GYSL had a temporary existence in four schools which adopted the project in or after 1980 (schools 24, 28, 29 and 30).

3. **The departure of teachers.** GYSL was discontinued in four schools when the members of staff who had taught the project moved to other schools and were replaced by teachers who lacked experience of the project (schools 4, 5, 7 and 11).

4. **Alternative GCSE syllabuses.** The official Avery Hill GCSE syllabus was rejected by six schools in favour of syllabuses which resembled the former joint GCE/CSE syllabus (schools 17, 19, 25, 27, 31 and 35). Three schools chose other GCSE syllabuses (schools 1, 23 and 26).

5. **The geographical location of schools.** When GCSE courses began the concentration of project schools noted earlier became even more pronounced. Six of the eight schools teaching the official Avery Hill syllabus were located in a small area to the east of the city centre (schools 10, 14, 15, 32, 38 and 39). Furthermore five of the six schools teaching the alternative syllabuses noted above were located in the eastern part of the city.

CONCLUSION

The publication of teaching materials, organization of training courses and establishment of a network of support do not necessarily ensure that a curriculum innovation takes root in schools. An innovation may be received but not adopted by some schools and have a temporary or even ephemeral existence in others. Dissemination and implementation are processes rather than events and take place over a period of many years. The spread of an innovation may begin slowly and later accelerate to reach a peak, only to be followed by a period of contraction. Decisions taken by teachers and their movement to and from schools at specific geographical locations help to explain the emergence and disappearance of the shifting centres of an innovation.

NOTE

This paper is based on part of a larger study, The Impact of a Curriculum Project, available from Educational Review Occasional Publications, University of Birmingham, P.O. Box 363, Birmingham B15 2TT

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IMPLICATIONS OF RESEARCH IN CARTOGRAPHIC COMMUNICATION ON GEOGRAPHIC EDUCATION

Henry W. Castner

ABSTRACT

Cartographic communication research has provided a language for describing precisely the ways in which we interact visually with graphic images and with our surroundings. It has also given us a keener appreciation of the role played by the map user in the communication equation.

This paper examines some of the implications of these developments for the ways we define our goals in geographic education and introduce the basic concepts of geography. It will be argued that a more valid approach to geographic education should acknowledge the various visual stimuli that we use, the various intellectual levels at which we process them, and the behavioural and cognitive, as well as the representational aspects of geographic thinking.

INTRODUCTION

The growth of cartography as an academic discipline and as a research activity has been particularly vigorous during the last quarter of a century. Suffice it to say that that growth was driven in part by a desire to better understand how maps and the people who use them interact. This paper explores some implications of this increased understanding for introducing maps and mapping to young people in an educational setting.

The body of theory emerging from research in cartographic communication has produced a variety of communication models, a descriptive vocabulary of the component processes in that mode of communication, a variety of workable research methodologies, and a number of general guidelines for the purposeful use of various graphic elements in map design. All these are well documented in the literature and can be accessed for use in investigating specific map design problems. In contrast, one less visible product of that work involves a greater awareness and respect for the role and information needs of the map user in the communication process. If we also consider humans to be active explorers of the world, both physically and perceptually, then we should extend this awareness of information needs to include those during orientation and locomotion and in thinking about geographic concepts and generalizations. I will argue that a more valid approach to geographic education should acknowledge the various visual stimuli that we use, the various intellectual levels at which we process them, and the behavioural and cognitive, as well as the representational aspects of geographic thinking.

CARTOGRAPHIC COMMUNICATION

The essence of concerns in cartographic communication can be summarized by a simple model such as Figure 1. It "reads" something like this. The world, or reality, is sampled for information about some particular topic. This data sample is usually gathered and processed by a map author in order to make a particular generalization or show a particular "landscape", whether it be physical, cultural or abstract. The map maker translates that data into suitable graphic elements in a map. The map, whether in printed or electronic form, is viewed by a map reader who constructs his own image of reality from that viewing. It is our hope that the map reader's image of reality bears a close resemblance to that of the data set, and thus by extension to the real world beyond. In order for this communication to be most effective, it is necessary that there is a certain amount of shared knowledge and feedback between the map author, map maker, and map users, particularly when they are separate individuals. In the case of children, we must be aware of their special needs and limited skills in this process.

The value of such diagrams, however, is not in the precision with which they describe the communication process. Rather, it has been in how they collectively shed light on: 1) the numerous ways in which communication can be considered; 2) the ways noise can arise in a system; 3) how much the map user contributes to the success or failure of the communication process; and 4) how we can apply knowledge of the visual system to map design. Of

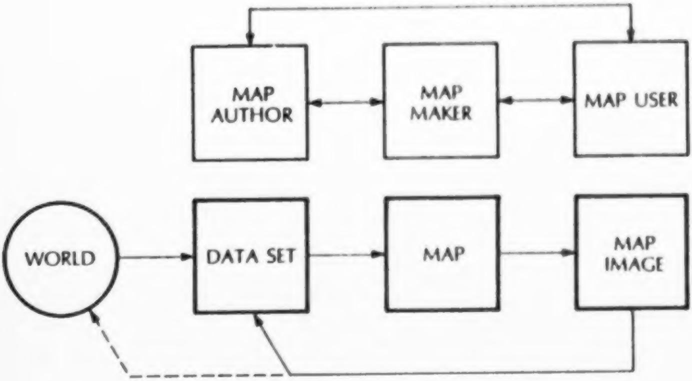
MAP AUTHOR
MAP MAKER
MAP USER
WORLD
DATA SET
MAP
MAP IMAGE

Figure 1

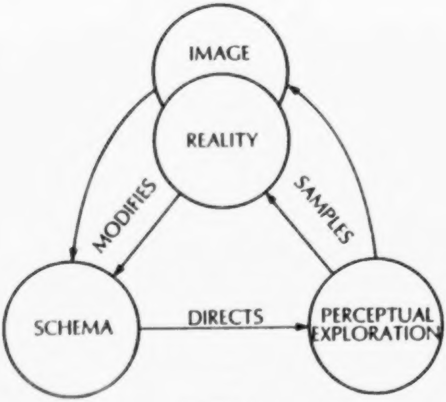
IMAGE
REALITY
MODIFIES
SAMPLES
SCHEMA
DIRECTS
PERCEPTUAL EXPLORATION

Figure 2

these, items 1) and 3) are most revealing of the potential breadth and richness of geographic education.

VIEWING A MAP OR SCENE

To explore this, it is useful to consider the great variety of visual stimuli that geographers utilize in their work: landscapes, photographs, paintings and drawings of landscapes, maps of various kinds, and now electronic and digital images. In viewing them, we react in various interactive and educational ways as we try to understand the world. More specifically, we look at it (or representations of it), we think about it, and we try to represent it. I have tried to include all these processes of discovery in the term "mapping" which I define as that combination of: *thinking* about the world and some aspect of it or phenomenon in it; *determining* the essential characteristics of that aspect or phenomenon; *considering* the various forms and modes of representation possible; and only then *executing* some representation of that aspect or phenomenon.

When we consider the cyclical nature of perception, these ideas can be represented in a diagram such as Figure 2. The "image" in this Figure might be any of those mentioned above. The schema represents whatever information we hold about a given geographic place or concept. This knowledge is manifest in: 1) the images (or mental maps) we conjure up in our perceptual exploration of those places and concepts; and 2) our visual sampling of images and scenes. This Figure provides a more complete view of what geographic education should be about. Not only is there the traditional *representational* aspect, but there is a *conceptual* side as well that relates to our attempts to impose order, structure and meaning to the environmental things that we see. In addition, when we consider humankind as a mobile observer, there is a third, a *behavioural* aspect to be considered. It would be hoped that our curriculum in geography would reflect all three aspects by setting goals and describing activities in each. To do this, we must be aware of the information needs of young students in each of these three aspects, and the levels of their intellectual involvement. Let me review the latter first.

LEVELS OF INTELLECTUAL INVOLVMENT

Education practice would suggest that the main goal of the representational aspect of geographic education is the creation of maps as inventories of objects and features in space. These inventories are then interrogated using questions such as "Where is..." or "What is this?" Petchenik (1979) calls these "questions about place". Cartographic communication terminology identifies them as "reading" activities, much as one uses a dictionary to look up something. But these questions do very little to raise or answer questions relating to the nature of space itself, i.e. to reveal the relationships between objects within it. To do this, cartographic communication theory suggests that some systematic sequences of map reading activities will allow us to examine and extract the implicit relationships among the mapped features. These processes are called map analysis although synthetic procedures are by no means excluded. The most obvious are various distance measurements or finding routes from one point to another. But for more complex interrelationships (such as those which define regions and boundaries), we seem to have failed to develop other, more appropriate procedures of map analysis. This is an area crying out for elaboration.

The third and highest level of cognitive interaction is called map interpretation. It involves the use of other information that is available in the map user's mind, either in short term or long term memory. Typically, we might inspect an assemblage of discriminable elements and systematically match them with elements which we have learned are typical of that kind of landscape. A simplistic interpretation might be that "those contours describe a hill with a convex north slope and a concave south slope." Or we may be able to envision the implication of adding a feature at a place, e.g. of placing an obstruction across some particular road or stream. As our experience increases, we are able to correlate some arrangements of features (in view) as being typical of a particular place or region (not seen) without any conscious matching of a "list" of characteristic traits.

Obviously, at the lower levels of intellectual involvement, the sought for information must be present and available in the visual stimulus. Conversely, at the higher levels, more information must be brought to the viewing transaction by the observer. Thus we cannot ask interpretive questions of children if the necessary knowledge base isn't available, whether in the child's mind or in other classroom materials. As young children do not have the experience or background knowledge of adults, they can not engage in very sophisticated map interpretation. Thus it is logical that we ask them to read maps at the very beginning. But then there is evidence that we quickly jump to map interpretation questions. What seems to be missing are ways of enriching their experiences so that they can apply knowledge and logic to rather than guessing at interpretive questions.

Educational theory suggests that opportunities for mapping activities by children occur most commonly in the concrete, topological space of their early environments -- the nursery, home and neighborhood. It is granted that children do make maps of these environments, but their efforts are limited mainly to inventories and "Where is" questions about them. It is curious that we have developed so few activities aimed at discovering and describing some of the topological relationships among spatially arrayed phenomena. These activities provide one way of extracting the structural relationships which define an important aspect of space itself.

My concern is that we probably ask children to do too much map reading and inventory mapping and not enough analysis and exploration of non-Euclidean relationships. It is as though in English class children were allowed to only use dictionaries and never to read or create essays, poems, short stories, political tracts, directions on "how to do", descriptive narratives, etc. Could it be that we have been too slow to recognize not only these levels of intellectual involvement, but also the different information needs for the representational, cognitive and behaviourial aspects of our thinking about the world? Briefly let me review these.

INFORMATION NEEDS

Research in cartographic communication suggests that for any particular map, we should first determine all of those things which the map user might be expected to want to do with it. We can call these the activities in map use. They are important for they speak directly to the representational requirements of the map. By extention, we should also be considering our information needs in thinking about and moving through space -- the cognitive and behavioural considerations.

Representational

With the potential map activities in mind, we can identify what information is central to their execution, what information is supportive of them, and what information is irrelevant. Knowing this, we have a basis for assigning graphic importance to each piece of information that we retain and, in the case of the irrelevant information, for removing it from the map altogether. What we don't seem to stress is that maps can be more than simple inventories. They can have very specific communication goals that relate to the lives and activities of young children in school.

Given more kinds of maps to make, young map makers will need to be armed with a more thorough understanding of the graphic variables available to them and be given opportunities to make use of them in solving particular communication problems. By graphic variables I mean the attributes of point, line, area and letter symbols that can be manipulated in order to make the kinds of contrasts and visual hierarchies that are necessary in communicating ideas graphically.

Cognitive

Given our three levels of interaction with scenes and images, we should be providing students with more information about the ways in which they can explore and systematically discover knowledge about space. Various analytical and synthetic procedures are the best for gathering information about the relationships among objects and features on a map or in a scene. These, in turn, will allow students to begin to make statements about the nature of space itself and thus to undertake more complex interpretations.

Behavioural

Finally, actual movements in space require the ability to orient oneself and to maintain an awareness of place despite many turns and changes in position. Essential to this is information about landmarks that are suitable for orienting oneself and determining direction and position at many different geographic scales. We tend to teach latitude and longitude even though it is a system inappropriate for many scales. Why then do we not spend more time, for example, on methods of obtaining orientational feedback from local environments?

CONCLUSIONS

Presumably, in cartographic and geographic education, we wish to train students in all three aspects of geographic thinking so that students can respond to graphic images and scenes at all three levels of intellectual involvment. It is not enough to simply teach about the conventions of cartographic practice as though that was tantamount to learning about the underlying graphic, communication and geographic concepts. If we provided more opportunities for students to employ and manipulate the perceptual logic of graphic expression, then children could begin not only to develop a wide range of analytical and communication devices but also to come to understand their underlying conceptual bases and the implicit relationships we believe shed light on the nature of geography and the world around us.

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THE CHANGING NATURE OF RESEARCH IN GEOGRAPHICAL EDUCATION IN THE UNITED KINGDOM

Norman J Graves

ABSTRACT

The purpose of this paper is to test the notion, that research in education and in geographical education in particular, is likely to be policy driven to greater extent in the future within the United Kingdom. To this end a brief analysis is made of the changing nature of geographical education research and of the influences affecting it. It is concluded that, although influences do not emanate from government policy only, the latter is the more powerful because of the financial backing which is associated with it.

INTRODUCTION

The United Kingdom has seen in the last 10 years or so, an increasing tendency for central governments to become directly involved in the running of education and in giving directions to the agencies which in one way or another undertake the work of education in practice. The sources of this increasing central government interference in the processes of education can be traced back to the Ruskin College speech of the then Prime Minister, James Callaghan (now Lord Callaghan) in 1976, in which he expressed anxiety about the standards of education in UK schools. In fact it is more likely that he proved a catalyst for what the Department of Education and Science (DES) had been wanting to do for some time (Lawton, 1984,8). The evidence for this lies in the setting up by the DES of the Assessment of Performance Unit (APU) in 1974, and the leaking of the so-called Yellow Book, a report on educational standards produced originally for James Callaghan (Lawton, 1980, 37-38). The process of central government interference continued unabated during the late 1970s and 1980s. The Manpower Services Commission (MSC) an offshoot of the Department of Employment, was created in 1972 to help in the development of manpower resources. In practice it has become an arm of government to introduce new means of training young people both in Further Education and in schools. Thus the Technical and Vocational Education

Initiatives (TVEI) was introduced into schools in 1982 with the co-operation of the DES and paid for by the MSC. The resources made available were gladly seized upon by teachers who had been working with a dearth of resources (books, teaching aids, equipment) in previous years. To benefit from such resources, teachers had to develop courses which satisfied criteria given by the MSC. The next step in the growing influence of central government came with the passing of the Education Reform Bill of 1988 which effectively gave the Government the right to determine the general framework of the school curriculum or National Curriculum.

It is clear that geography as a subject has not escaped from this growing power of central government over education. In so far as the government through the Secondary Examinations Council (SEC), determined what the national criteria for all examinations for the General Certificate of Education (GCSE) would be, in so far as the SEC also approved the subject specific criteria, in so far as the SEC was to approve 'grade related criteria', so the process of control and standardization increased. The question posed is: how far has research in geographical education been affected by these trends?

THE EVIDENCE

If one examines what has been produced in the field of research in geographical education in the past 20 years in the United Kingdom, one can begin to assess whether this research has or has not been much influenced by the growing power of government in education. The sources of this production are first, the institutions of higher education, second the Schools Council and its two successors: the School Curriculum Development Committee (SCDC) and the SEC; third the National Foundation for Educational Research (NFER); fourthly the DES itself; and lastly any individual or corporate research not undertaken by any of the previous bodies. I am conscious that in examining the evidence I am likely to stretch the meaning of research to include curriculum development work, feasability studies, pilot surveys and so on. However, I believe this to be legitimate since action in education is often based on the results of such studies, rather than on strictly controlled experimental research. Further in this brief paper, I can only mention examples of such research; there is no space to give an exhaustive account. Not all the research mentioned will necessarily have been published, much lies buried in dissertations and theses.

The research emanating from institutes of higher education shows the greatest concern for what may be called some of the fundamental issues within geographical education research. For example the ways in which concepts in geography are acquired (Ghaye 1984), the development of map skills and map understanding in Geography (Tierney 1985) (Okpala 1987) a field given much stimulus by the work of Gerber (1981) and Wilson (1980) in Brisbane; the contribution of geography to educational endeavour (Huckle 1983) (Naish 1985), the problem of progression in geographical understanding (Bennetts 1981), values in geographical education (Slater 1982). But this is not to say that such fundamental issues dominate in quantitative terms. Much research which has been undertaken by teachers is concerned with such practical issues as the use of satellite imagery (Smyth 1985), the use of textbooks (Lidstone 1986), the use of computers (Kent 1986), evaluation in geography either of student learning (Wiegand 1980) or of the curriculum process (McElroy 1980) and so on. These are related to problems which arise in teaching and that teachers find useful to investigate. Indeed more research students are interested in such practical problems than are in the more fundamental issues that often underly them. These two sets of research topic complement and feed on one another.

If we look at the work of the Schools Council and its successors then we are struck by the debt that geography owes to the various curriculum development projects which were financed by the Schools Council. The Schools Council was founded in 1964 and terminated in 1982 by Sir Keith Joseph, then Secretary of State for Education and Science. During its 18 year existence it financed the Geography for the Young School Leaver Project, the Geography 14-18 Project, the History Geography and Social Science Project 8-13 and the Geography 16-19 Project. The last of these national curriculum development projects was the Geography 16-19 Project which started in 1976 and officially ended in 1985. Although not strictly research, these projects had a measure of research built into them in so far as they involved investigations into ways of structuring curricula and pilot studies or trials to evaluate how far the proposed curricula were feasible. The teams that devised the curricula received advice from their consultative committees, interacted with teachers, LEA advisers and Her Majesty's Inspectors (HMI). But to my knowledge, there was no attempt to impose any particular pattern of curriculum; the teams were free to devise such schemes as they felt were desirable educationally and feasible within the means at the disposal of most schools. The Geography 16-19 Project admirably described in the Handbook (Naish, Rawling and Hart 1987) is testimony to the freedom the team had to develop its geography curriculum for the 16-19 age group. Thus although all the projects were financed, at least in part, by central government money, their was no attempt to direct their work to any particular ends of Government policy, save that of raising the general quality of the educational process.

The successor bodies, SCDC and SEC were somewhat different animals from the Schools Council. First the SCDC (soon to be converted into the National Curriculum Council or NCC) was much less well funded than the SEC and both together had fewer resources than the former. Secondly the SCDC was concerned mainly with small scale curriculum development in various areas indicated to it by the DES. The SEC proved to be the more powerful body since it controlled the examinations and in particular the new General Certificate of Education Examination (GCSE) for 16 year olds. In relation to geography (and to other subjects of course) it financed studies into the subject specific national criteria, to which all examinations in geography had to conform. Thus no examination group setting up a new examination for the GCSE could afford to ignore either the general criteria or the subject specific criteria. The SEC also financed studies of 'grade related criteria', that is descriptions of what performance at various grade levels would mean in geography. This was a result of a new prediliction of educationalists and the DES for 'criterion referencing' as against 'norm referencing', since the idea was to be able to describe precisely what a student could do who had obtained, for example, Grade D in the GCSE. The reality proved somewhat more complicated (Murphy 1986) and as a result there will be no application of grade related criteria in the first GCSE examination. However, the point of describing this is to indicate that the successors to the Schools Council, particularly the SEC funded work of a particular type with a particular end in view. It was DES policy to have grade related criteria, so work had to be done to produce grade related criteria. The fact that years of research and experimentation were required was something that the DES which has no research staff, had not realised.

The NFER is a body set up by the LEAs and the then Ministry of Education as far back as 1946 to investigate such 'practical problems arising within the public system of education as are amenable to scientific investigation'. It has been used for example in connection with the APU in assessing the standards of performance in English language, mathematics and a foreign language. To the best of my knowledge it has never been asked to investigate a problem in the area of geography. There is therefore no evidence to be gleaned from the work of the NFER in Geography, though there is plenty of evidence that their work in other areas is policy directed. The DES as already stated, does not have a research department. It does, however, commission research from other bodies and it often uses the HMIs as gatherers of information or as writers of booklets which to some extent reflect HMI views, but increasingly reflect DES policy. One such survey was 'Aspects of Secondary Education in England' (DES 1979), which however, had little to say about geography. On the other hand, booklets such as 'The Teaching of Ideas in Geography' (DES 1978) and especially 'Geography 5-16' (DES 1987) whilst appearing namely to make suggestions for teachers, take on a somewhat more prescriptive stance, especially the latter which was originally drafted in the context of Sir Keith Joseph's appearance at a Geographical Association's special conference.

Since the decision was taken by the Government to impose a National Curriculum, several Task Groups have been set to work. These had remits to undertaken work on Assessment and Testing (under Professor Paul Black), on Mathematics (under Professor Roger Blin-Stoyle) and on Science (under Professor Jeff Thompson). So far only the Task Group on Assessment and Testing has reported (DES 1988). This group has confirmed the feasibility of the decision of the Secretary of State to test pupils at 7, 11, 14 and 16 to monitor their performance. It argues for 10 levels of achievement over the years of compulsory schooling (5 - 16) with children at 7 being capable of achieving at levels 1, 2 or 3, and pupils at 16+ being capable of achieving at levels 7, 8, 9 or 10. These levels would apply in all subjects. Thus the next step is the setting up of a Task Group in Geography to define not only the curriculum from 5 to 16 but also the kind of levels of performances which might be expected. If this is to be done properly, it will require a considerable investment of the best talent available in geographical education, involving some empirical work as well as careful thinking about progression, sequence and testing. Hence I would surmise that much research effort will be devoted to this issue in the years to come.

In relation to other research, we are already seeing some individual research being influenced by the nature of the agenda set by government policy. Thus the stress being given to vocational training has led to a number of dissertations being concerned with geography and employment and TVEI (eg Govan 1984, Davidson 1985) and so has the emphasis being given to information technology (Cummings 1984).

Further among the corporate bodies undertaking developmental work, the Geographical Association sets up working parties to examine various aspects of geographical education, two of which can be ascribed directly to policy decisions taken by the Government, one on Records of Achievement (Graves and Naish 1986) and another on Geography and Industry (Corney 1985).

CONCLUSION

At one time research undertaken in Geographical Education in the United Kingdom depended on (1) what ideas researchers had about the problems they wished to investigate and (2) in the case of funded research, what value the funding body placed on the proposed research. Today an increasing body of research and quasi research is being undertaken because it fits the policy goals of the United Kingdom Government. This is both because research and development is being channelled in directions which fit in with policy as in the case of the work financed by the DES directly or through the SEC; and also because funds are made available through the research bodies for projects which are in harmony with Government policy, as is the case for research in the application of computers to geographical education. It also applies indirectly to research undertaken by individuals in so far as government policy creates problems that need investigation. Thus the introduction of TVEI courses, the launching of 'Industry Year 1986', the promotion of economic awareness across the curriculum, all are examples of government policies which have led individuals to undertake research work in these areas.

If the above contention is correct, one may further ask the question: does it matter? One could argue that to investigate problems created in education by government policy is reasonable. The difficulty, as I see it, is the extent to which this kind of policy bred research becomes dominant. One could argue that, in the United Kingdom, the marginal position that geography has in government thinking on education, has meant that not a lot of policy attention has been directed to it. On the other hand, with the advent of a national curriculum in geography, many resources may be channelled into the structuring and evaluation of such a national curriculum, leaving few resources for other work. The case for balance between policy led and other research needs to be made since experience shows that progress in a field tends to come from unexpected quarters.

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TOWARDS IMPROVING STUDENTS' PROCESSING SKILLS AND THE EFFECTIVENESS OF GEOGRAPHY TEACHING

Vena Jules

Abstract:

Using a qualitative design involving 5 geography teachers and 233 students in the first phase and 4 teachers and 98 students in the second phase, two exploratory studies were done. These studies looked at the effects on student learning in geography when teachers and students deliberately used these 5 mental processing skills:- comparing, ordering, inferring, classifying, predicting - in classroom instruction. In all 4 cases studied, results on teacher-made pre and post-tests showed a significant difference ($p=.05$). Additionally, many students showed significant improvement on the processing skills measurable on the Cattel Culture Fair Test of 'g' scale 2 Form A

Introduction:

One area meriting particular concern and attention in the search for ways of addressing the perennial problem of poor student performance and low achievement, is the classroom or what passes for classroom instruction.

In the process of classroom instruction, three (3) main variables interact simultaneously to bring about learning while creating a learning climate receptive or unreceptive to incoming information. These are (1) the learners; (2) the teachers and (3) the material (content, skills, attitudes) to be learned. Planning for effective instruction must of necessity take this triad, and factors which impact on them, into consideration. This paper underscores the importance of each of these main variables in the planning of classroom instruction. It further proposes that classroom teaching would not only be more effective but also more efficient if:-

1. Both teachers and students were aware that the mental processing skills involved in any act of learning were: ordering, comparing, inferring, classifying/categorizing, predicting (Nickerson, 1984). No hierarchy is intended. The number and sequence would be determined by the assigned learning task.
2. In the pre-planning and implementation phase of classroom instruction, teachers included a step that deliberately identified the cognitive mental processes demanded by the content of the lesson.
3. Teachers used this processing breakdown and their knowledge of the students' characteristics to select a strategy or strategies suitable to students.
4. Students were encouraged to reflect on how they learned - in other words, engage in metacognition.
5. Students were assigned further tasks in order to encourage transfer of the learning recognized in (4) above.

In order to monitor more closely the possibilities of these assumptions, the pilot stage of a qualitative study was designed, and conducted. The following is a report on this study.

The Study:

The study was two phased with teachers being asked to use the five mental processing skills outlined in (1) above to identify the cognitive demand of the lesson and to organize lessons for instruction.

The aims of the study were to monitor and record:-

Phase 1: a. the effectiveness and efficiency of classroom instruction via student achievement of objectives, relative to past performances, when the mental processes identified in (1) were used in a prescribed lesson.

Phase 2: a. the effectiveness and efficiency of classroom instruction when these processes were used on a wider scale;

b. the effects on students of this use;

c. any refinement of methodology that may be needed for later more controlled studies.

Method:

Because of possible ethical issues and the fact that these two phases of the study were exploratory, a case study approach was used. For phase 1, the prescribed lesson was the case in point. In phase 2, four teachers' attempts at using the treatment to develop and implement lessons for their class, were the cases involved.

PHASE ONE - 1983-1985

Procedure:

A lesson on four-figure grid referencing (Appendix 1) was devised by the researcher including the five (5) steps outlined earlier, and in 1983-84, one teacher was asked to teach the lesson as prescribed when the topic came up during the school year. The lesson was taught as prescribed in the regular time slot, to the regular class of students under normal conditions. The only imposition was the prescribed lesson. The result was 100% mastery in a learning time of 20-25 minutes as against the usual 40-45 minutes. In the second year (1984-85) four other teachers followed the same procedure with the same impositions. All told in phase 1, 233 students were exposed to this prescribed lesson in four schools.

Findings:

All teachers reported mastery of the concept by the students and a reduction in the usual teaching time by one third to one half. From one school a teacher even reported the exuberance of one of her slower students as this student exclaimed that it was the first time in his life that he had ever 'gotten' everything right! The use of the mental processes to identify the cognitive demand of a lesson and consequently to organize the lesson into short sequenced steps had been useful in teaching a lesson on four-figure grid referencing to geography students beginning secondary schooling.

Implications:

Can it be useful in bringing about greater efficiency and effectiveness in geography teaching or more generally all teaching-learning situations? Can it help in improving students' mental processing?

PHASE TWO - 1985-1986

Procedure:

Four teachers and four classes finally took part in this study and these four cases will be reported on.

The use of the five mental processing skills - comparing, ordering, inferring, categorizing/classifying and predicting - (i) to identify the cognitive demand of lesson content and (ii) to encourage student reflection and transfer of learning via application, was explained and demonstrated to a group of eight (8) student teachers. These teachers were given the opportunity to develop lessons using the mental processing steps.
Because of time constraints the large group of eight later appraised and discussed one lesson and tidied it up, with the supervisor acting as facilitator. Four teachers were later asked to use, in a similar manner, the processing skills and meta-cognition steps outlined, in the planning and development of a unit of work for study. These four teachers were selected because of similarity of class level and the fact that the study unit they identified involved common elements of the skills section of the Caribbean Examinations Council geography syllabus. These common elements were map making, map reading and map interpretation. There was therefore neither imposition of unit nor external determination of content. The units indicated in Table 1 were what the teachers had planned to teach at that time to their regular class of students and that determined the content.
Again the only control was for level with the four classes used in this phase all belonging to the 2nd tier of the secondary level of the education system. One would recall that one aim of this phase was to assess whether the average teacher would be able to use the treatment on their own, there were therefore no prescribed lesson plans. Teachers were instead asked to use the treatment (the mental processing skills) to plan and implement lessons as they saw fit for the unit of work designed for their respective classes.

However the specified steps in the study procedure for each case were as follows:-

1. Pre-test Cattell Culture Fair test of 'g' Scale 2 Form A.
2. Teacher-made test following careful specifications relative to the unit content.
3. Lessons in unit taught with common treatment in planning and implementation.
4. Post-test - same as (2) above.
5. Post-test - same as (1) above.

(See Table 1 for detailed breakdown of procedure).

The Cattell Culture Fair test was used because its 4-test format allowed the tester to monitor either negative or positive movements a testee made in the mental processes of ordering, comparing, classifying and predicting based on conditions. All four tests demanded that the testee make inferences.

TABLE 1

Procedure followed by each in the four (4) cases studied

Class Teachers	Pretest (1) Cattell Test of "g" Scale 2 Form A	Pretest (2) Teacher-made Test	Content (3) Map Skills Inter Alia	Treatment (4) Mental processing skills used both in planning and delivery	Duration (5)	Post test (6) Teacher made test	Post test (7) Cattell Test of "g" Scale 2 Form A
A	✓	✓	General introduction to map making and map reading	✓	5 wks	✓	✓
B	✓	✓	Weather - map reading and interpretation	✓	5 wks	✓	✓
C	✓	✓	Soils-Map skills application from books	✓	3 wks	✓	✓
D	✓	✓	Farming - Map skills application from field work	✓	3 wks	✓	✓

Some Comments on Limitations of the Study:
Many factors may affect this study. Among those associated with teacher differences are:-

1. The quality and style of instruction.
2. Their knowledge of subject-matter.
3. Levels of appropriateness of selected teaching strategy relative to student characteristics.

Among the students themselves, there are differences in (1) their actual and potential development; (2) their learning styles; (3) their self concept or levels of self esteem.
They also attend different types of secondary schools which the public has put on a hierarchial scale of one to six.
All of these differences however, are typical of the real situation.
Pertinent also is the possibility of the so-called Hawthorne effect - improvement in performance of a group solely because that group is receiving special attention. Indeed two (2) teachers (Cases 2 and 3) have raised it as one of the factors that could affect the results of their study. Bearing these limitations in mind, the findings and analysis will next be considered.

Findings and Analysis:
The design of this pilot study generously allowed the findings to be drawn from two rich sources: (1) the teachers' observations and (2) assessment of students' achievement. Highlights of the teachers' observations for phase 2 have been reported in case reports, while for phase 1, the findings on the prescribed lesson were given. In all cases, the difference between the pre and post-test means (t-test) of the teacher made tests was significant at the .05 level. Learning therefore seems to have taken place. However this does not necessarily lend any credibility or significance to the use of the mental processing skills. The statements made by the teachers however, seem to allow

the following specific conclusions to be drawn:-

1. Generally teachers felt that using the mental processing skills was a worthwhile exercise since there was for them visible evidence that students' learning and reasoning/ thinking were improved by its use. Students, they felt, seemed now more willing to take responsibility for their 'coming to know'.
2. Application of the mental processing skills may be transferred to other disciplines e.g. in Case 3.
3. As far as efficiency is concerned, the evidence is inconclusive. Two teachers used less time than the normal teaching time. Two other did not. The former stuck to the syllabus objectives. The latter pursued students' interest into unusual areas of content and this therefore has blurred objective comparison.

Preliminary results seem to indicate that these four (4) classroom teachers were able to use the treatment.

Table 2 was compiled from the lesson plans of the 4 teachers involved and shows the frequency with which the students were made to use each of the five processing skills.

It seems possible to conclude therefore that these four (4) teachers were able to use the treatment in their teaching of one class, and encourage transfer and reflection.

Apart from achievement of lesson objectives, there remains the problem of assessing how much students have improved on their mental processing skills (ordering, comparing, enferring, classifying and predicting) during the period of treatment. In spite of its limitations to do this as effectively as may be necessary, an exploratory attempt has been made to pilot the use of the Cattel Culture Fair test of 'g' Scale 2, Form A as this type of instrument. This test was given to students both at the beginning and end of

Table 2: Frequency with which mental processing skills were used in each case.

CASE 1

Lesson	Comparing	Ordering	Inferring	Classifying	Predicting	T & R	
2	x 3	-	1	1			
3	1	-	1	1			
4	1	1	1	-		1	1
5	1	1	1	1		1	1
6	1	1	1	1	1	1	1
7	1	1	x 2	1		1	1
8	1	1	1	1	1	1	1
TOTAL	9	5	8	6	2	5	5

CASE 2

	Comparing	Ordering	Inferring	Classifying	Predicting	T & R	
TOTAL	8	9	9	9	8	7	

CASE 3

	Comparing	Ordering	Inferring	Classifying	Predicting	T & R	
TOTAL	12	10	12	9	8	10	10

CASE 4

	Comparing	Ordering	Inferring	Classifying	Predicting	T & R	
TOTAL	6	5	8	6	1	5	1

Note: Totals for all cases (arrived at as for Case 1 but only summary given)

the study. No study lasted less then three (3) weeks and since the test developers claim:-

> *With more than a couple weeks intervening, it is safe to use the same form or forms for a retest. Indeed, the Culture Fair Scale 2 can be re-administered to the same children at yearly intervals. Test-retest reliability - the correlation of the test with itself at different times - was +.82 for 200 American high school freshmen, +.85 for 450 British secondary school entrants and +.71 to .94 for Spanish Americans (not speaking English).*
>
> *(Cattell and Cattell, 1965, Manual p.5).*

.....the same form of the test was given.

A look at the breakdown of the entire test reveals that:-

Test 1 (series) should be able to measure students' ability to order and infer.

TABLE 3

Cases	Test 1		Test 2		Test 3		Test 4		I.Q.	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	7.95	9.00 *	7.82	7.56	7.4	8.17	4.7	4.74	67	96
	p = .005 r = .936		p = .098 r = .816		p = .050 r = .889		p = .999 r = .902		p = .002 r = .937	
2	8.67	9.3	7.5	8.23	8.5	8.4	3.42	3.6	90	95
	p = .125 r = .8		p = .057 r = .924		p = .999 r = .819		p = .999 r = .91		p = .013 r = .969	
3	9.6	10.07	7.96	8.96	9.5	10.08	5.5	6.5	107	120
	p = .110 r = .629		p = .002 r = .888		p = .088 r = .906		p = .005 r = .852		p = .001 r = .906	
4	8.00	9.5	5.6	9.5	8.9	8.9	3.4	4.6	84.2	109.1
	p = .08 r = .825		p = .001 r = .981		p = .999 r = .883		p = .079 r = .914		p = .005	

Mean of pre and post tests (Cattell) and the probability of such differences occurring in a normal distribution Significance level = .05

Test 2 (classification) should be able to measure students' ability to classify.

Test 3 (matrices) should be able to measure students' ability to compare, order, classify and infer.

Test 4 (conditions) should be able to measure students' ability to order, comare, infer, classify and predict.

Assuming that the test can measure what is claimed, the results on each of the tests by school, as seen on Table 3, can be analyzed. The probabilities related to mean intergroup differences on matched tests are in Table 4.

It will be noted from Table 3 that there was positive improvement in student scores for every cell except four (4). In five (5) cases out of the possible 16, this improvement was significant at a .05 level, with seven (7) others approaching this significance level. It is also evident from Table 4 that intergroup score

TABLE 4

CASES		1		2		3
1	T1					
	T2					
	T3					
	T4					
2	T1	.729				
	T2	.451				
	T3	.811				
	T4	.922				
3	T1	.194	T1	.259		
	T2	.619	T2	.651		
	T3	.417	T3	.998		
	T4	.055	T4	.222		
4	T1	.568	T1	.844	T1	.197
	T2	* .001	T2	* .001	T2	* .001
	T3	[illegible]	T3	.156	T3	.519
	T4	.130	T4	.231	T4	.177

T = Test

Probability of mean changes (inter group differences on matched tests) being significant - Level of Significance ≤ .05

differences were not significant (except for Test 2, case 4 in all cases) and this, in spite of significant changes in pre-post test scores of individual groups.

Available data, only part of which is shown in Table 5, illustrate that, while pre-test score differences between each of the other groups and Case 3 were at an extrememly low probability level (high significance level), this probability increased both on the post-test and on the differences between these two (2) tests. One may infer therefore that the gap between Case 3 and the others closed slightly. This is important when one considers that Case 3 students belong to a seven year traditional school where students are believed to be more achievement oriented, while the students of the other three (3) cases are at senior comprehensive schools or schools of expected low achievement.

Table 5

CASES PROBABILITY

	Paired Comparisons	Pre-test 1	Post-test 1	Difference
	1 + 2	0.163	0.891	.727
*	1 + 3	0.001	0.190	.189
	1 + 4	0.954	0.458	[illegible]
*	2 + 3	[illegible]	0.333	[illegible]
	2 + 4	0.377	0.768	.391
*	3 + 4	0.040	0.313	.197

Probability of inter group score differences on Test 1 (pre and post test)

CONCLUSION:

In spite of the fact that experimental type constraints were not set up at this time and therefore comparison of these results with some control group/s was not feasible, it seems possible to make some connection in these 4 cases between the deliberate use of processing skills and students' significant improvement in processing.

The results are encouraging, but of course only tentative, even for the teaching of geography, which was the discipline used in this study. Results therefore cannot yet be generalized to other unexplored disciplines. If however, what is revealed by these 4 cases is any evidence of what may occur in the population, this pilot study does seem to provide the basis for further work.

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APPENDIX I

Prescribed Lesson and Explanatory Notes to Teachers

LESSON TOPIC: Four Figure Grid Referencing:

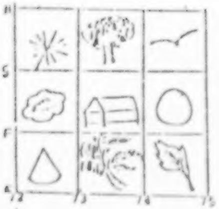
Instructional objective: Students should be able to use a four figure grid reference to locate an area on a topographic map.

Resources: Work sheets for Activities 1 and 2 as per Figures 1 and 2; Topographic maps for final exercise.

METHOD - Simple Game

Activity 1 - The teacher gives instructions to students that they are to work through to the end of (iv).

Activity 1

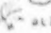


Exercises

(i) If is at 74F and is at 72G, what is at? Did you get 73F? If you did, you are correct.

(ii) If is at 74E; what is at? Did you get 72E?

(iii) Now what is at?

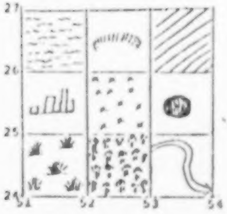
(iv) What is  at?

(v) How did you arrive at your answer?

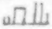
The teacher asks question (v) to a few randomly selected students to ensure processing is as desired and that locational concepts are clear.

NB: It is necessary to ensure mastery at this level before proceeding to Activity 2.

Activity 2



Exercises

(i) If is at 5324; is at 5325 and is at 5126; what is  at? Was your answer 5125? Then you were correct.

(ii) What are these at?

(a)

(b)

At this point, depending on need, an additional activity, similar to Activity 2, may be added.

Activity 3 - the topographic map

A topographic map with grid lines is next introduced. (One per student as is situationally possible). Exercises using this map are set at the discretion of the teacher depending both on time availability and mastery level of students. At this point no illustrative example as in (i) of Activities 1 and 2 should be necessary.

NEW RESEARCH AT THE INRP SINCE 1983 (1) :

(INITIAL AND IN-SERVICE) TEACHER TRAINING

IN DIDACTICS THROUGH RESEARCH

A great many research projects on the pedagogics of different disciplines have been carried out at the I.N.R.P. between 1969 and 1983, other projects are in progress at the moment, especially in research on the didactics of history, geography and the social sciences.

For a long time now (since the beginning of the 70's) the researchers and teachers associated with these projects have been prepared to "demonstrate" the interest for the whole educational system of the results of their studies when completed or during their work. They have therefore addressed some teacher training courses at the request of the Inspectors, the Heads and lecturers at teacher training colleges and of the Heads of Mission of the training schemes in the different administrative areas. Some of them have been members of the National Commissions working on the Revision of the School syllabus.They have thus been able to take all these opportunities to show what can be done by presenting tools and curricula which have been tried out and evaluated in the course of their research work ; they have been able to explain how, while respecting official or experimental syllabuses, they have managed to apply pedagogical objectives , coherent pedagogical itineraries, teaching methods adapted to mixed ability classes, an objective method of evaluation (to analyse the pupils' progress in learning situations without actually marking them or an overall evaluation at the end of a term or a given subject).They were able to explain how they were successful in their application of hypotheses of spiral acquisition of conceptual knowledge. (2) ...

However the researchers could only take part in the teacher training courses occasionally. We must now determine, through research, how all teachers might be able to take advantage of these procedures which have been set up by the teams of teachers associated with the I.N.R.P.'s research projects during their official training (initial and in-service). One of the major results has in fact been a very efficient personal and reciprocal in-service training of all the teachers taking part in this research work.

How can we introduce these new competence " boosters" into the teacher training courses for all teachers? Starting from research on the didactics of disciplines (the classroom is the "laboratory " : application of the inter-relations between the teaching process and the pupils' learning processes, experiments on and evaluation of these interrelations)

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(1) I.N.R.P. : "Institut National de Recherche Pédagogique", 29 rue d'Ulm, 75230 PARIS CEDEX 05

(2) J-S BRUNER The Process of Education, Harvard University Press 1960.

should we not move on to research on teacher-training in didactics ? (teacher training courses would naturally become the testing ground).

In 1983, the Research department on Initial and In-Service Training in Didactics through Research was created at the I.N.R.P. : the aim of the five on-going research projects is to create opportunities for teacher-training through research, strategies for teacher training in didactics through research which can be fitted into the official government teacher training programme.

Mixed competence teams (including all those whose job specification includes taking part in training a given group of teachers) have been formed for these new research projects at the I.N.R.P.: for training primary school teachers (1)

, for instance, the teams include lecturers at teacher training colleges, university lecturers, without forgetting the I.M.F. (Primary school teachers working in an advisory capacity to train others - They are responsible for the teaching practice). For teacher training at secondary level and beyond, the teams may include the official instructors from the Regional Pedagogical Centres (Inspectors, Educational Advisers, lecturers) university lecturers and teachers working in an advisory capacity for the teacher training department attached to each administrative area. To recapitulate : in research on the didactics of different disciplines, the research teams are made up of groups of teachers who still actually teach in a classroom situation, researchers from the I.N.R.P. and university lecturers; for teacher training in didactics through research, the teams are made up of the various instructors who take part in the training courses, researchers and university lecturers.

What have been the main milestones in our research between 1983 and 1987 ? We intend to set out here what has been achieved during the two research projects on training for primary school teachers in didactics (history, geography and the social sciences) through research

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(1) In France, primary school teachers teach several subjects. They are in charge of the 5 years of the childrens' schooling

from 6 to 11 in Primary School. Whereas up until 1968 they only had a year's teacher training course after their "A" level (baccalauréat)(2), they have gradually been included in many in-service training courses and at the same time their initial training has been made considerably longer. In 1987 the initial training for primary school teachers lasts for four years after baccalauréat- they must have a DEUG (First two years of a university course leading to the University Diploma of General Studies) and then go in for a competitive entrance exam for a Teacher training college and go through two years teacher training there.

How were these research projects able to get started so quickly (1984-85) ? There are two reasons for this :

- the lecturers at the Teacher training colleges are experienced in teacher training (for years they have been teaching on the successive government organised training courses for primary school teachers) they are well acquainted with the problems of initial and in-service training ;

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(2) The French "baccalauréat" is equivalent to GCE A level, "Abitur" in Germany or the first two years in an American college.

- these same lecturers at Teacher training colleges and the IMF, (the primary school teachers who work as educational advisers to the trainee teachers) in these teams had in most cases already taken part in a long research project in the didactics of disciplines (1970- 1984) : they had helped set up a new pedagogical approach called "activités d'éveil" (that is to say ,an authentic process of construction of knowledge by each child) in history, geography and the social sciences for children from 6 to 11; they then experimented on and evaluated the whole syllabus. During these projects they had spent some considerable time reflecting on the different disciplines, analysing their content, fixing their objectives and looking at methods of evaluation.

They were thus able, as early as 1984-85, to elaborate theories from their previous experience and practice and come up with four experimental models of training through research and then in 1985- 87, they were able to bring out tools developed through research :tools for teacher training in didactics through research.

All these projects were carried out by a dozen teams throughout France in conjunction with the I.N.R.P.; these new research projects have constantly linked theory (scientific knowledge ...) and practical application in the classroom to their mutual advantage.

FROM FUNCTIONAL MODELS TO A THEORETICAL MODEL OF TEACHER TRAINING THROUGH RESEARCH

How can one describe these training "models" ? We should first point out that these models are flexible and not closed and intransigeant . They were able to be drawn up thanks to the prior experience and criticism of the teacher/researchers and their experiments. They are only a step in the whole research project : all the researchers are aiming to arrive at a single theoretical model as flexible and wide-ranging as the four models which have already been tried out.

Various activities, compulsory courses and strategies which enable teachers to get a solid grounding in didactics and enable them to use research type approaches have therefore been planned to fit into a training college timetable. A rigorous approach should be maintained at all times (as regards both the disciplines, the methods and a knowledge of the pupils' learning possibilities ...) coherence (coherence between the objectives, the contents of the courses and the successive training activities) and flexibility are essential : it should be possible to use the same model flexibly, but with rigour and coherence " a variable structure model " in different teacher training situations which may vary according to the number of days or hours of training in a given centre,according to the teacher training school, or the age of the trainees and their level of higher education (primary school teachers having studied at university or not, having been through teacher training college or not ...) and according to the type of training concerned, initial or in-service ...

Our task was to determine through research, for these models and in these different situations, what the essential parts of the course were, the most efficient strategies ...How can one manage to retain the essential aspects of a training scheme which was supposed to take six or eight weeks, if one has only three or four ...?

So what are the "vital" elements of a training course, the elements which cannot be omitted and how can one link them up ?

All the research teams seemed to think that the primary school teachers essential training should include

1. A "critical" reflection on the discipline which the teacher teaches or will be teaching.

   The instructors either start by choosing a subject to be studied with the trainees or they propose a subject (a subject which is on the pupil's syllabus) vast enough to be used in various situations (the town , the village, the Third World...) or they may choose one aspect of the subjects to be studied : types of neighbourhood, urban polarization in a region ...

   A set of background papers (texts, graphs, statistics, maps, photographs ...) is immediately given to the trainee teachers.

They are asked to work in groups and "construct " complete sequences from the definition of the objectives which they would like to pursue with their pupils, to the draft plan of the written work in their exercise books and they must decide what tools will be used for evaluation. This very thorough "lesson preparation" session thus takes place in teams.

It is then followed by a plenary session during which instructors and trainee teachers will come forward and make a critical analysis of the trainee's work in the light of didactic reflection (epistemology applied to the subject chosen for study, psycho-pedagogical references adapted to the level of the pupils for whom the "lesson" is being prepared...)

A general discussion should bring out the primary school teachers' mental representations of their disciplines and their pupils.

Several other stages may be added to this initial phase of the training course.

2. A theoretical reflection on the discipline : epistemological knowledge and the application of this knowledge to the subject which was prepared and then discussed (Stage 1)...

3. A theoretical reflection on the learning processes : cognitive psychology, the pupils as they really are, singly or in groups ... the relationship to knowledge, the question of the documentary back-up (the "correct use " of visual material, texts, graphs and other documents according to the

level of the pupils...); this reflection leads to a clearer view of interrelations between processes, didactic transposition and the didactic contract being brought to the fore and also to an examination of the notion of error and the primary teacher's approach to it and choice of assessment criteria.

4. A pedagogical reinvestment (an actual application of the lesson material prepared during the course) during teaching practice in class with the IMF should bring to light the pupils and trainee teachers' mental pictures and enable them to achieve operational objectives and carry out subsequently -between adults

   instructors and trainee teachers - a constructive and critical look at what has been achieved : was the trainee teacher able to observe the pupils in a learning situation ? Did he keep to the objectives which he had set himself ? What were the "short comings" in the teaching and learning processes ? How were the pupils' mental representations used ? What kind of mistakes were noticed ? How does the IMF react to them ?...

5. How to put a course together

Before the end of the initial training (or the end of a session of in-service training), the teachers taking part should be capable of working out a coherent pedagogical itinerary based on the official syllabus, class by class and for the whole of the primary school cycle. They therefore have to examine the official reference documents (syllabuses and instructions) and clarify the aims, objectives and subjects of study proposed.

As it is not possible to cover the whole syllabus with the pupils, one has to make choices. Some of the subjects proposed are more important than others; an analysis of the content of the syllabus should enable one to distinguish the essential parts; certain subjects will be dealt with rapidly, others deserve more thorough study and will enable the teacher to go into some concepts in depth, develop methodological skills and attitudes while at the same time enabling the pupil to grasp the facts. A syllabus will be gone through " at two speeds " depending on the relative importance of the subject to be studied. Adequate provision should be made in the timetable for these privileged themes (in an invariably overloaded timetable for children who have to take many disciplines...)

The quality of the primary school teachers' training is of paramount importance : the more numerous and dynamic the work sessions, the more in-depth and exhaustive the synthesis can be.As with pupils and students, it is true to say that the authentic mental activity which the teachers have to engage in during their training is the guarantee that they will acquire the necessary skills.

6. The creation of networks for teacher training through research

The sessions of initial or in-service training for primary school teachers should introduce these research techniques. But are these privileged moments organised by the instructors sufficient to create a really permanent dynamic process ?

The experimental models we have used lead to a final phase which is the responsability of the teachers who are being trained. When one leaves Teacher training college, when one becomes a teacher in a primary school, responsible for a class, is it possible to continue with one's training in close collaboration with one's colleagues ? We have worked on the hypothesis of the creation of local training networks, organised by the teachers themselves, which would develop training through research (assessment of the pupils, putting together background papers and documents, curriculum development ...)

Networks of this type would need the support of the primary school inspector, the municipal authorities ... and of course that of the C.R.D.P. (Regional Centre for Pedagogical Documentation) and the training school as a source of material, lecturers and advisers within the county. Networks of this type are theoretically not a Utopian idea; in practice it is very difficult for even an experienced primary school teacher to bring his colleagues to work together and pool their ideas, even within one school. This final phase of a real, permanent "in-service training" will be one of the privileged areas of the present research projects : how to set up and keep local training networks going, highly decentralized and autonomous networks which are nevertheless in contact with training centres and on-going research.

The above analysis is not totally representative of the main options of the theoretical model which is being built. The teachers engaged in research still have some questions to settle : should one present an epistemological analysis on a chosen subject once it has been prepared by the teachers during their training course? Wouldn't it be better to begin the training session by a historical resumé of the discipline and its development, by an overall epistemological reflection on the present state of the discipline, what is at stake and the theoretical discussions which are going on ? Shouldn't one start by a "detoxification session" for the teachers: removing their misconceptions about their discipline and the way it is taught before going on to the active and interactive phases of their training? Wouldn't it be useful to have a questionnaire on their mental image of the discipline and the way it is taught; the instructor could show the trainees a kind of mirror image of their ideas on science and pedagogics. Since the filled-in questionnaires are treated as if they were anonymous, wouldn't it be acceptable to make teachers in training aware of their representations ?

This type of research presupposes that all the instructors are very knowledgeable about the epistemology of their discipline, the underlying theories of their development and their evolution ... a supposition which cannot easily be checked. Nevertheless, an initial and in-service training in didactics through research should not rule out serious reflection on the discipline and its potential application at various levels of teaching, a thorough meditation on learning processes and methods of evaluation ...

The research which is being done at the moment will not solve all the problems posed; it should bring about a significant reform of the present training programme and an improvement in the quality of the training and, let us hope, an increase in the number of successful pupils.

The four models mentioned previously and the "theoretical model which is being built " were experimented using tools developed during research.

TOOLS DEVELOPED DURING RESEARCH: INSTRUMENTS FOR TEACHER TRAINING IN DIDACTICS THROUGH RESEARCH

Some "tools" or working aids are indispensable for carrying out research (experiments and evaluation) but also to work out coherent training itineraries. These tools which were developed by the research group and tried out in 1986-87 will be systematically used, amended, improved and completed in 1987-89 until they are quite operational. They are nevertheless the prototypes which already give an idea of the tools which will be proposed to the Ministry of Education with the theoretical model for the renewal and improvement of the primary school teacher training programme.

It is not possible to publish them here in extenso (1), but their objectives and main features will be mentioned.

1. A questionnaire designed to bring out the representations (1) teachers have on history and geography (epistemology / scientific knowledge) and teaching in these two disciplines

After having used this tool, experimented it, improved it and then experimented it again, we adopted it in spite of its imperfections.

It is designed to be used by the instructors at the very beginning of an initial or in-service training session and then again as a retest. The important thing is what the instructor or instructors do with the information they have collected: it is possible to motivate a group of adults by starting with a description of the data collected and the wide-ranging debate which will inevitably follow. The personal data sheet (age, studies ...) filled in by each trainee, should enable certain typical profiles to be established on a national level. The trainee primary school teacher who has passed the exams at the end of the first two years at university "tends to think that ...", "tends to imagine ...", a graduate in geography (holder of the equivalent of the English B.A. or graduate having finished an American college) "tends to think.." "is inclined to believe ..." . The retest (using the same questionnaire and the same personal data sheet) should enable one to have some idea - taking a large number of trainees, what use the two year course at the training college in history and geography has been as far as modifying representations is concerned (making a comparison between the data collected at the initial test and at the retest).

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(1) An MFRP (Mission Formation Permanente aux Didactiques par la Recherche)- INRP publication "Intermediary report on Research projects 116 and 117 " (June 1987) introduces :
- the different directions of enquiry of these research projects;
- the four functional models of teacher training in didactics through research, the problems encountered when they were being tried out and the beginnings of a typology of the itineraries of teacher training through research;
- the tools developed through research: instruments for teacher training in didactics through research;
- the principles of development and the main options of a theoretical model: the unfinished model (in the state it was in in June 1987).

Since our questionnaire was neither calibrated nor algorithmic, it is obvious that its main purpose is to enable each team of instructors to show the trainees teachers at the beginning of their course, a mirror image of their ideas, a game, which in itself is not exempt from difficulties ... As with any tool, prior to using it, the instructor should be aware not only of its possibilities, but also of its drawbacks or even of its dangers, especially when it is a question of investigating what other people think. A strict deontology should be applied.

2. The questionnaire evaluating didactic transpositions.

This is a self-assessment questionaire with additional commentary sheets which can be used during research, during the initial or in-service training sessions, but also by the primary school teacher alone in his class. This questionnaire and the commentary sheets amount to a kind of general survey of all the steps which work in didactics supposes.

It represents a synthesis - and enables there to be auto-analysis - of all the various processes we expect the trainees to go through.

This questionnaire is certainly a tool, an instrument for training through research, since it makes the primary school teacher take an active and critical intellectual role by enabling him to focus his attention successively on precise aspects of the thought processes. It is also an operational tool, a kind of teaching aid, helping the teacher to prepare his teaching skills for his classwork with his pupils. It enables him, at each point

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(1) With reference to the Representations see F.AUDIGIER 's article " A National symposiium on the Didactics of History, Geography and the Social sciences". INRP, 18th, 19th and 20th of March 1987, L'Information Géographique, 1987, No 51, pages 125 to 127.

in the process, to define what he is aiming at and evaluate how valid his decisions are.

This questionnaire consists of two main parts :

1. How to anticipate and organise the didactic transposition

1.1 Choice of the subject to be studied

...

1.2.Preparation of the subject to be studied

...

1.3.Application of the procedures decided on

...

2. Evaluation of the didactic transposition

2.1.Evaluating the pupils' level

(concepts, factual references, methods)

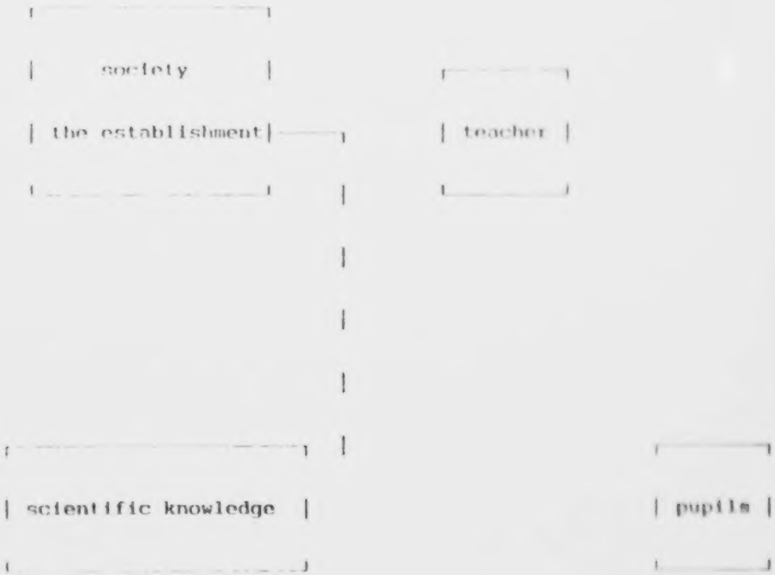
...

2.2.Analysis and measurement of the distances

...

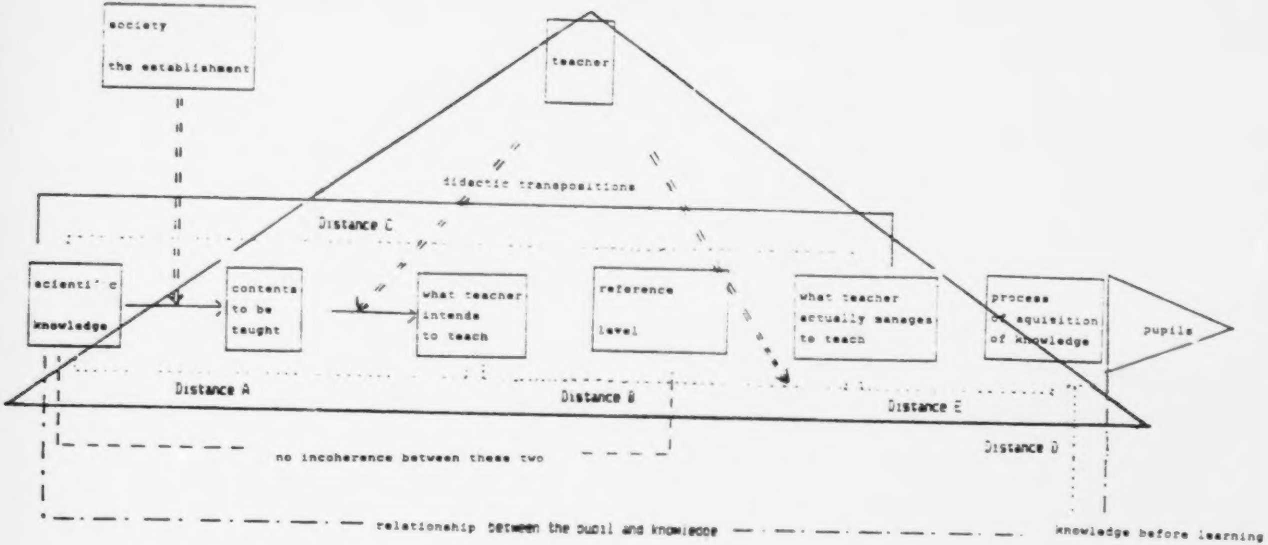
Every teacher puts didactic transposition into practice during the teaching processes he or she uses. Even the university lecturer transposes the products of research, the elements of the most recent discoveries in scientific knowledge when he works with his students. It is not only a question of the obligations of communication, but also of adapting what one says and the way one says it to the objectives and the public one is aiming to reach. We call this gap a distance. The gap on the next page shows all the distances which exist, between scientific knowledge and knowledge as it is actually taught and the assimilation of that same knowledge by pupils or students. There are a whole succession of didactic transpositions.

We should bear in mind that all these relationships interact within the framework of the "didactic triangle".


society
the establishment
teacher
scientific knowledge
pupils

but that society and the Establishment exert permanent pressure on all points of the triangle.

The analysis and measurement of these distances, that is to say, of didactic transposition , would require conceptual tools which have not yet been fully developed in history and geography.


society
the establishment
teacher
didactic transpositions
Distance C
scientific knowledge
contents to be taught
what teacher intends to teach
reference level
what teacher actually manages to teach
process of aquisition of knowledge
pupils
Distance A
Distance B
Distance E
Distance D
no incoherence between these two
relationship between the pupil and knowledge
knowledge before learning

But the phenomenon can be clarified and analysed. For the didactician in a given discipline, the concept is a tool which enables one to stand back,to question the obvious, to chip away at simple ideas, to free oneself from the misleading familiarity of the object of one's studies, in short to "exercise one's epistemological vigilance" (Y.CHEVALLARD) (1).

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(1) Y.CHEVALLARD Didactic Transposition. Publisher : La Pensée Sauvage Editions, Grenoble 1985.

In order to understand the diagram on the previous page, we shall briefly describe the various "distances":

- Distance A

what the teacher intends to teach / scientific knowledge of a given discipline

What the teacher intends to teach is a complex combination :

. it should be sufficiently close to scientific knowledge.

. the teacher shapes it as he thinks best

. part of the content derives from the Establishment (knowledge to be taught- Official Instructions, aims)

. the content depends on the educational tradition and the social group (accepted ideas)...

The primary school teachers' training should enable them to renew their knowledge and lessen the gap between scientific knowledge and knowledge as it is taught. What are the aims ?

. to bring the pupils to build up their knowledge and their intellectual culture themselves while having a critical awareness of the way knowledge is built up and used.

. to train future adults who will be responsible and autonomous.

The teacher has to keep in mind all the parameters which have a bearing on knowledge and on pupils (age, educational level, socio-cultural background, mental representations of society, knowledge acquired during previous schooling ...) All these elements are captured in interaction in the didactic system .

- Distance B

what the teacher intends to teach / what the teacher actually manages to teach

What the teacher intends to teach corresponds to what is written on his preparation sheet. What he actually manages to teach can be assessed by the teacher while he is working in class and by evaluating not only what the pupils have acquired, but also the strategy and the processes which he has used. As a feed-back another similiar session (in another class for example) , can be more successful (cut down the distance) if in the light of the first experience one has carefully evaluated the knowledge previously acquired by the pupils, their ability level, the quality of the pedagogical aids used, the teaching process being applied...This Distance B cannot be dissociated from Distance E (the gap between the knowledge acquired by the pupils and the contents of the lesson).

- Distance C

  what is actually taught / scientific knowledge of a discipline It is important to be aware of the distance between this and commonly accepted knowledge and the extreme relevance of this gap by comparison with the scientific facts of a discipline.

- Distance D: evaluation of what has been acquired

. comparison with knowledge before learning

. an overall evaluation (see grids 1,2 and 3 further on).

- Distance E

  knowledge acquired by pupils / what the teacher actually managed to teach

  This gap should take into account the evaluation made in Distance D, but it also poses the problem of the processes of acquisition of knowledge by the pupils. Numerous factors interact : the type of learning involved, the pupils' level of culture (social representations, experience, place of the discipline in the school curriculum ...) the way each person reinserts the new knowledge into his own symbolic structures ...the problem of class dynamics, the type of pedagogical approach, the didactic contract (or its absence).

- Distance F

knowledge acquired by pupils / scientific facts of a discipline

This is not simply the sum total of the gaps between the distances as they have just been analysed. A series of graduated questions should be worked out (with the help, for example, of a combination of grids 1,2 and 3) to grasp the level of construction of concepts and more generally the acquisition of knowledge.

We wanted to enable others to realise the essential role that this reflection and these tools of didactic transposition play: they are vital tools for training teachers in didactics through research. The other "tools" will be described more quickly: they are nevertheless the result of long research projects which have lead to the development of instruments which are most useful in teacher training and can be used by each teacher in his or her classroom.

3.NOTIONAL REFERENCE GRIDS

History and geography, which form two quite distinct disciplines, each have their own notional corpus.

It was not possible during a vast research project which went on over several years, including teacher training college lecturers and researchers, to analyse all the concepts which make up these disciplines and evaluate their interaction, both among groups of teachers and among pupils in experimental classes. To carry out the research (epistemological reflection, choice of subjects to be studied, evaluation ...) two very wide-ranging notions were chosen : power and social space.

We did realize that other basic concepts could have been selected and that the two we chose are not on the same level: power is a fundamental concept (which although it is not the sole motor of history, is also present in the topical theme of geographical space) ; social space is the basic notion in the new school of geographical thought; it is fairly accessible to primary school children ; it is in keeping with the group of researchers' idea of contemporary teaching in geography.

These two notions are introduced in most of the subjects chosen for study (see the Official syllabus) for pupils in primary schools and they are therefore used during training sessions with primary school teachers. They should not necessarily be considered as being parallel. From time to time it is useful to put the two concepts together and read both in history and geography, in past and present, about power networks in the context of social space.

The theoretical research projects on these two notions have been carried out (as was the case for the other research "tools") by a National Commission (university lecturers and teacher training college lecturers) which met regularly under the chairmanship of the researcher responsible for the project at the I.N.R.P. This epistemological reflection led to several cards being drawn up and then used in a classroom situation by the twelve teams (epistemological reflection by primary school teachers in training ...)They enabled the National Commission to put together the notional reference grids (power and social space), real research tools, but also teaching aids which any primary school teacher can use.

4. Formal grid for assessment of pupils

This is a highly efficient tool.

1. Define what is to be assessed

1.1. Notions and relationships

specific notions and relationships(isolated cases)
more general and more abstract notions and relationships
interdependence of notions and relationships
overall idea of the system

1.2. Mental attitudes

comparison
construction of a model or a diagram
hypothetico-deductive operation

analysis

synthesis

criticism (documents, first-hand testimony)

1.3. Skills and know-how

representations

how to use information, for example

how to read a map, interpret a picture...

how to draw maps, diagrams, graphics...

coding, decoding

how to search for information...

2. Define the levels of assimilation of knowledge, skills and attitudes

2.1. Ability to reproduce what he has learnt

. . .

2.2. Transfer or reinvestment

. . .

2.3. Ability to deal with problems

. . .

3. Methods of evaluation

3.1. Immediate assessment : in learning situations to analyse the pupils' progress (opinion polls, questionnaires, immediate reinvestment in the pedagogical sequence in progress or in the next one)

3.2. Overall assessment (appraisal of a series of sequences)

. . .

This kind of tool had already been practically developed, in a different way it is true , during an earlier research project at the end of which we wanted to carry out an overall notional assessment as a continuation of our research hypothesis " on the spiral development of concepts". (see J-S BRUNER)

5. Cross-reference grids

In order to make the tools developed during research even more efficient, two tables have been drawn up, one on the concept of power and the other on social space. They have various functions, they enable one to define the content and form of assessment questionnaires; they also provide a graduated catalogue of objectives which allow one to elaborate pedagogical sequences bearing in mind the degree of difficulty. To give the reader a clearer idea of the nature of this tool, there is a partial example on the next page :

N.B. The crosses marked above in columns ABCD and E are indicative. It is in fact difficult to measure a degree of difficulty precisely out of context and without a strict definition of the content. But we have noticed during training with primary school teachers that these tables are of great value in helping the teachers find things out for themselves.

RESEARCH PERSPECTIVES IN IN-SERVICE TEACHER TRAINING IN DIDACTICS THROUGH RESEARCH

1. Development principles and the main options of the model

- The principles

The choice of the concept of a "model" is the result of a compromise solution between the empirical and the theoretical. It is an intermediary synthesis of research carried out in 1984-86 using the four functional models already experimented.

The choice of the concept of a "model" also refers to the study of systems science : it refers to the action of teacher training as a system. The following data must therefore be integrated into it:

. the various elements of the training process (human, material, institutional, scientific ...) the functions of that action, the links and interactions between component parts and functions

. the elements which lead to regulation, reciprocal adaptation and evolution of the model (1).

- The main options of the model

If the conceptual tool for the development of the reference model is the system, the methodological tool is analysis of the aims of the objects and functions of training in the didactics of history, geography and the social sciences through research.

It is vital to define the objectives, even the operational objectives, otherwise there can be no assessment or self-assessment. But the research group is working on a tool that should remain flexible: the model should be a "reservoir of possibilities", an aid in working out training strategies ..., one must be able, at any time, to adjust the actions to take into account the material, human and institutional constraints which influence (in different ways depending on the situation and the place) the action and system of training.

We have put forward the hypothesis of

training by contract which implies the negotiation of a contract and therefore the working out of a project between the instructors and the trainee teachers so that the process of the act of training can get under way ;

a transfer between situations and functions. The future primary school teacher or the teacher on an in-service training course should be put in a situation where he actively, and as an adult, lives through what he will later be applying in his class with his pupils. We are putting forward the hypothesis of training in objectives through objectives, of training in pedagogical contracts through the use of pedagogical contracts, of training in immediate assessment to analyse the pupils' progress without actually marking them through immediate assessment... we are in favour of the organization of learning situations which allow for different degrees of sophistication of knowledge by putting the teachers who accept this principle in a training situation themselves

For the moment, we have decided on a training/research strategy in five stages :

starting from reality

conceptualization

operationalization (lesson preparation)

application

assessment

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(1) on this subject see : J.BERBAUM Systems Analysis study of Teacher Training, P.U.F. , 1982.

The experimental stage and the assessment of the functioning of this theoretical model which has not yet been completed will be carried out in 1987-89.

2. Can the reflection and the tools which have already been developed be used, transferred and adapted to teacher training in history, geography and the social sciences for secondary school teachers ? Can they be used for teacher training in didactics through research for teachers in other disciplines ?

These two important questions cannot be answered unless specific research is carried out.

It is none the less true that elements, at least, of this research which is centred on training in the didactics of history, geography and the social sciences for primary school teachers, correspond to needs felt by teacher training instructors at all levels and these elements should be introduced as soon as possible in all teacher training courses :

. epistemological reflection should be introduced systematically since every teacher should be interested in the scientific status of the discipline he teaches; he should be able to comprehend the structure of knowledge in his specialised field, to define the lines of enquiry, determine what is to be studied and what approach should be selected. But this reflection should be developed while keeping a critical attitude and it should not be dissociated from methodology.

. didactic reflection should be carried out in depth; it might be useful to remember the definition of this concept :" didactics aims to study the processes of transmis sion and assimilation of knowledge, in the practical and theoretical aspects of knowledge which are specific to the content." (G.VERGNAUD) (1).

. knowledge acquired through pedagogical research ;

. knowledge acquired through cognitive psychology and the psychology of the learning processes;

. the concept of didactic transposition which was not initially discovered in our disciplines, but which seems to have a general application.

Research projects organised by the M.F.P.R. and the I.N.R.P. should enable us to define the various problems better and provide some answers. A research project on teacher training in didactics through research for upper secondary school teachers of history and geography is already being organised.

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3. How can teachers be made into teacher/researchers ?

We have already mentioned this difficult problem. It is not a question of transforming all teachers into researchers in the didactics of their discipline or in Educational Science, the aim is to give them an efficient in-service training. What can be done after an initial training along the lines of the model we are experimenting, for example, and the sessions of in-service training in didactics through research which they may take part in ?

In-service training through research is certainly possible if the teacher is prepared to commit himself to taking on a research project individually (at university or another centre) or participating in an organised collective research project. But up till now, any participation of this kind only took place on a voluntary basis. What is more, the finances allotted to the "pedagogical" research budget on a national or regional level only provide for a limited number of teacher/researchers to be taken on ; a kind of equilibrium is established between the budget and the number of volunteers, nearly all the applicants are integrated into research teams. The I.N.R.P. , for example, has a few more

than four thousand associated teacher/researchers , whereas there are about 700,000 teachers in the French National Education authority.

To make the introduction of in-service training in didactics through research for all teachers easier, wouldn't it be possible to offer systematically

. in-service training courses for all the primary school teachers in a school, for all the teachers in the same discipline in a secondary school or a higher secondary school: The formation of teams of this kind, even for a short period, would encourage

"longitudinal" coherence (the ability to plan coherent pedagogical itineraries from one class to the next...) and

"horizontal" coherence (what strategies, what pedagogical methods for mixed ability classes ... what common method of evaluation could be applied in parallel classes of different levels.. it would simplify further contacts and dialogue ...

- research-training contracts leading teams of teachers in their school and their class towards specific common goals and putting them in contact with researchers from the I.N.R.P., university lecturers ...
- individual contracts for self-training ...

Anyone in a position of responsibility in the educational system knows that these hypothese are very "ambitious" and far from leading to a rapid generalisation, unless there is a new training scheme for all those engaged in teacher training, a reorganization of the content and especially of all the training methods and unless there is an increase in the budget.

The work which is being done at the moment by the instructors from the teacher training department of each administrative area among the teachers,and by the instructors working in the Teacher training colleges among the primary school teachers is essential: it should be possible to integrate a flexible model, the contents, strategies and methods of application, to make up a training course in didactics through research. Any "teacher training institute" whatever its name and status may be, which proposes high level courses, adapted to the needs of the trainees, remains the vital pivot which will enable teachers to improve their skills and bring them up to date.

But it is equally essential for the instructors to be able to develop their reflection and improve their skills. Research projects on the didactics of disciplines and on teacher training in didactics through research should be one of the tasks of these instructor-researchers ; this by no means rules out other research projects, carried out by specialised researchers at a very high level; all the same it would be a positive step if the instructors were aware of the methodology and the results of research projects of this kind.

The setting-up of an in-service training scheme, with the support of the training colleges for primary school teachers, using a full-scale complex network nevertheless remains a difficult task to put into practice; it would lead however to a considerable multiplication of the actions and to a fertile exchange between training/research and the classroom. Significant incentives should be found to step up and support initiatives of this kind which help to link theory and practice and improve teaching and learning processes. Primary school teachers will take an active part in in-service training in didactics through research when they know that they can count on this training to bring them help and satisfaction in their daily work.

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THE EARLY POLITICIZATION OF THE GEOGRAPHY CURRICULUM IN ENGLAND

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ABSTRACT

This paper briefly relates how the geography curriculum was tied in with key power structures in England in the nineteenth and early twentieth centuries. It traces connections between religious fundamentalism, world exploration and the knowledge explosion, colonialism, scientific racism and perceptions of urban crisis, and the mediation of influential bodies such as the churches, scientific societies (such as the Royal Geographical Society) and imperial agencies, in infiltrating approved values, and attitudes and knowledge into schools, directly through text books and pedagogy, and indirectly through control of the burgeoning media which followed gathering literacy and leisure time in the second half of the nineteenth century. Geography was one of the early subjects at the cutting edge of this process of politicizing curriculum content.

INTRODUCTION

One of the contradictions in influential recent statements on the purposes of geographical education in England is that both in official pronouncement and radical critique there is agreement that the curriculum should include a political education component. Thus in the Department of Education and

Science 'Curriculum Matters' document *Geography from 5 to 16*, one of the objectives specified is that the subject should 'help pupils gain a fuller understanding of some controversial social, economic, political and environmental issues which have a geographical dimension'. Another is to provide opportunities for 'political education, enhancing pupils' levels of political literacy' (D.E.S., 1986, para 59), on the face of it not far removed from Huckle's plea for materials that 'take the geography teacher beyond mere political information, and offer a real contribution to political literacy'. (Huckle, 1983, 83). The hidden agendas are no doubt very different, for in an ongoing, contentious debate, both conservative and radical sides accuse the other of politicization. Its formal meaning is 'to give a political character to', but the *de facto* fear is that politicization involves using the curriculum to serve the ends of a dominant power group, whether the state or a local authority, promoting indoctrination, dictating the content and values to be transmitted.

At one time indoctrination meant to instruct in a subject. The 'great educators' disseminated their 'doctrines' (Rusk, 1956). Thus while Comenius could be counted a progressive educator in pedagogic terms, in insisting that learning should be made agreeable and promoted through the senses by visual means, his content was prescribed and its purpose was unequivocal: to make men 'wise, virtuous and pious', the earth and its living creatures providing testimony to the glory of God's creation.

THE POLITICIZATION OF THE GEOGRAPHY CURRICULUM IN THE NINETEENTH CENTURY

The religious fundamentalism that for so long dominated school provision was unashamedly directed to politicizing the curriculum, though that is not what it was called. In early nineteenth-century England, for example, the Anglican Church was extremely powerful: the Conservative Party at prayer. Its more reactionary wing saw little need for more than Sunday schooling for most of the population, but the more politically conscious regarded mass schooling as imperative as a means of controlling a potentially unruly proletariat.

Geography and history were beneficiaries of this religious control, becoming second only in importance to the 'core subjects': Reading, Writing and Arithmetic (the three R's). Geography was a malleable subject in a number of ways. In the first place, it could offer a service. At higher levels of education, for example, it provided basic knowledge about the spread of early Christianity. The 'Historical Geography of the Holy Land' was for long a prime component. At lower levels, the content of the subject lent itself to the most widespread fundamentalist contribution to pedagogy, catechitical teaching:

> 'Teacher: How may the Counties of England be grouped?
> Pupil: Into northern, southern and midland'.
> (Brewer, 1870, 21-3)

'Capes and Bays' geography was far from a mere neutral compilation of factual knowledge, to be learned off by heart, though this was part of the intent. For the facts to be learned were not restricted to the names of capes and bays, the heights of mountains and the lengths of rivers. There were also ex cathedra value statements, offered as as unassailable in their correctness as the names of capes and bays. Thus in Tate's pedagogical text of 1854, the teacher was urged to take advantage of the 'power of contrast'. To implement this, the page of information was to be divided into two columns, as a means of comparing, or rather contrasting, as in one example, two imperial nations, England and Spain:

Contrast

England	Spain
The elevation of the highest mountain, Scaw Fell... is only a little more than half a mile	The elevation of the highest point in the Pyrenees is about 2½ miles
....	....
The climate is damp and changeable	The climate is generally warm and salubrious
....	....
The religion is Protestantism	The religion is Roman
....	....
The workshop of the world	Cannot supply its own people with manufactured goods
...	....
Possesses the most perfect political institutions	A prey to civil discords
....	....
Its colonies flourish in every part of the globe	Its colonies are dismembered and enfeebled

(Tate, 1854, 71-4)

Heightening further the appeal of such xenophobic but populist compilations, was the fact that the new geographical knowledge was wonderful, communicating exciting detail about colonial expansion, helped by a technology advanced enough to communicate it vividly. Scientific exploration, geographical discovery, missionary zeal, and colonial initiative combined in a heady information brew. The association of such names as Fitzroy (of H.M.S. Beagle fame) and Livingstone, both of whom won medals of the Royal Geographical Society, with discoveries of mysterious new lands were heaven-sent opportunities for the promoters of geographical education. The translation of the values of RGS man to school level made geography potentially second only to religious instruction as a subject 'of benefit to mankind'. (RGS Correspondence Files, 1871-1880) Geography could teach the future colonist 'to appraise the value of a country' (Ravenstein, 1886, 165-6), the military man 'to plan a campaign' or help the entrepreneur 'in controlling a large business'. (Herbertson, 1904, 427) Leading figures of the highly influential Royal Geographical Society (Marsden, 1986) were predictably imperialist in their ideology, as in the case of Douglas Freshfield, a famed mountaineer, a Fellow and later Honorary Secretary of the RGS, and first President of the Geographical Association.

> 'Shall we English who inherit so large a part of the world not acquaint ourselves with our inheritance and the conditions under which we can retain and make the most of it? What has been the fate of our race? To be the greatest rulers and merchants and colonisers the world has ever seen... Do you think we are educating children for this high destiny... by comparative ignorance of the earth's structure, of the natural laws by obedience to which they may go forth and win peaceful victories and fill up the void spaces of our planet?'
> (Freshfield, 1886, 701)

More directly significant was Sir Halford Mackinder, a champion of geographical education and an eminent geo-politician. A unifying imperial philosophy characterised his work. He wrote texts for colonial children, using the medium of visual instruction, so that they would gain a 'just impression' of the United Kingdom (Mackinder, 1911, 79-86). His objectives were as explicit as those of Freshfield.

> 'Let our teaching be from the British standpoint, so that finally we see the world as a theatre for British activity. This, no doubt, is to deviate from the cold and impartial ways of science. When we teach the millions, however, we are not training scientific investigators, but the practical striving citizens of an empire which has to hold its place through the universal law of survival through efficiency and effort'.
> (Mackinder, 1911, 83)

It is therefore not surprising that in English school texts, and children's literature in general, a contented motherland was counterpointed with images of hostile environments, of enervating heat, exotic plants, dangerous mammals, barbarian inhabitants, and of unpleasant and often fatal diseases. But the commercial potential of these environments was also recognised. Thus Africa could be divided into:

> 'Healthy colonisable Africa, where European races may be expected to become in time the prevailing type...
> Fairly healthy Africa...
> Unhealthy but exploitable Africa... for the most part of great commercial value and inhabited by fairly docile, governable races; the Africa of the trader and planter and of despotic European control.
> Extremely unhealthy Africa.
> (Johnston, 1905, 275)

In the late nineteenth century, the appraisal became more overtly racist, as Darwinist thinking was transposed into social action. At one level there was unease about the nature of the new relationship postulated between human life and the animal creation. At another were related anxieties about racial decay which an increasingly overcrowded and perceived of as corrupt urban proletariat in Britain's large towns and cities was supposedly generating.

> '...while brooding over the awful presentation of life as it exists in the vast African forest, it seemed to me only too vivid a picture of many parts of our own land. As there is a darkest Africa is there not also a darkest England? Civilisation, which can breed its own barbarians, does it not also breed its own pygmies?'
> (Booth, 1890, 11)

The solutions included elimination and emigration. The latter became a popular proposal for relieving the problems of the cities. That geography in school might help to promote such emigration was proposed at the RGS.

> 'Only the more intelligent of the labouring population were generally those who went abroad; the most ignorant did not, and it would be a great national advantage if the Society would help to diffuse a knowledge amongst the lower classes'.
> (R.G.S. Keltie Report, 1886, 180)

Towards the end of the century the geography teacher had to come to terms with a new paradigm. Mackinder was the catalyst in promoting a new regional geography, bridging the gap between physical and political geography. Herbertson disseminated the idea through his secondary school texts, based on his 'higher units', the major natural regions of the world. (Herbertson, 1905, 100-10) On the face of it this provided a disinterested academic framework. Controversial issues were largely eschewed. But the new paradigm brought with it its own determinism. Environments became stereotyped in pre-digested regional packages. People took a back seat. School geography was effectively dehumanised and depoliticized.

At least this was the case at secondary level. In the phases of schooling in which the Herbertson framework was less influential, racial stereotyping was more apparent. For younger age levels, pedagogical theory suggested that an easy introduction to geography was through the study of simple peoples. Mackinder supported such thinking. His 'six roads' to geography were ideas for use with young children before the 'first book of geography' could be introduced, at about the age of eight or nine. The fifth of the 'six roads' was 'the romantic road of tales of distant lands and 'once upon a time''.

> 'Wonderland, with its sandstorms and camels. Where the land is drenched in Central Africa they will imagine dark forests and pygmies'.
> (Roxby, 1914, 405)

Tales of native life and the romance of exploration and settlement of distant lands were regarded as particularly fascinating for elementary school children. (Reynolds, 1915, 7), and new techniques of illustration were increasingly and disarmingly deployed. Covert politicization was even more evident in children's annuals.

> 'In part of our Empire called Cape Colony there are some black people called Kaffirs. They live in funny little round houses like big beehives. As it is generally very hot, they do not need to wear much clothing, but when they do wear clothes they are very fond of bright coloured things'.
> (The Child's Empire Picture Annual, 1912)

The spirit of Empire continued to surface in a number of English geography and history texts, at least until the 1960s. As late as 1958 Brady and Spink could unblushingly offer the following comment in a chapter entitled 'A Final

Word on Africa' in a school text on the southern continents, areas at that time usually studied in the earlier years of the secondary school, on the grounds that they were more straightforward than the northern.

> 'Now that we have noted all parts of the 'Dark Continent' we can see it is dark no longer... The tremendous efforts of the Europeans in the last hundred years have changed Africa to a remarkable degree. There are some big problems to resolve as a result of these efforts.
>
> 1. Relations between Europeans and Africans
>
> This is the great problem of the Twentieth Century. In those parts where the European makes his home in Africa, it is especially serious. In places like Kenya, Tanganyika, the Federation of Rhodesia and Nyasaland, and the Union, both races live side by side. Both are entitled to claim living standards suitable to their needs, but they are so vastly different in standards of civilisation that the needs of the African people are far fewer than the needs of the Europeans, and the African workers are able to live comfortably on much lower wages than the Europeans'.
>
> (Brady and Spink, 1958, 62)

Presumably it is a sign of progress that no current text-book writer could get away with such casuistry. It would be wise to remember, however, that greater sensitivity to the human issues involved was not a discovery of the 1960s or 1970s. Almost half a century before Spink and Brady, for example, a Boston Teachers' College lecturer was offering a more humane vision, wishing geography to show young children 'a world made up of countries and peoples differing in many ways but alike in more, and bound together by mutual esteem and need'. (Quoted in Lasker, 1929, 318).

CONCLUDING COMMENT

The notion that text-books should be scrutinised for stereotyping and other false images is not a new one, and has been espoused for some years now (See, inter alia, Marsden, 1976; Hicks, 1981; Wright, 1982 and 1985). Much research is still required in the area, however. A necessary underpinning is the establishment of a strong historical frame through which to probe the origins and evolution of the insidious politicization that stereotyping and other types of distorted consciousness promote. Even more important is the internationalization of such research. Here too a beginning has been made, in which colleagues brought together by the International Geographical Union have played a prominent part (See Haubrich, 1984). The impetus should not be lost. We still require more sophisticated frameworks and depth of analysis than have as yet been brought to bear on the complex subject of the politicization of the geography curriculum.

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MEMORANDUM FOR A WORKING GROUP:
EMPIRICAL RESEARCH IN THE DIDACTICS OF GEOGRAPHY

Helmut Schrettenbrunner

ABSTRACT

This is the third paper of a series concerned with the creation of a working group called "empirical research in the didactics of Geography" (Schrettenbrunner 1984, 1986).

If we strive to overcome well known deficiencies in the application of theories, in the design of research work, and in the choice of independent and dependent variables, we have to strictly apply rules common to all empirical social sciences.

Examples will be given how to construct research work and to choose significant variables. It is hoped that these guidelines will serve as a common basis for the working group as well as for future dissertations.

It is also suggested that the IGU commission will function as an international clearing post.

INTRODUCTION

Researchers in the empirical didactics of Geography usually face some crucial problems:

1. What are specific characteristics of our research? - a question of distinction between other sciences (e.g. empirical Paedagogics).

2. What is our theoretical basis? - a question of hierarchical order of sciences (e.g. paedagogical and psychological theories explain students' behavior, also if applied to geographical content learning).

3. What does a standard empirical design consist of? - a question of methodological expertise (of which our Geographer may be inexpert because his university formation did not include the required methods).

4. What statistical methods should be applied? - in most cases a question put in the wrong place, i.e. after the collection of data and not together with our points 2 and 3.

Useful help to these problems cannot come from within the didactics of Geography, but from outside, from sciences with a solid history of empirical research.

MAJOR GUIDELINES FOR FUTURE RESEARCH

To avoid the above mentioned crucial problems we should accept the advice given by empirical educationalists (Leutner, 1988a, 1, parentheses by H.S.): "The idea of empirical research in learning (with respect to geographical contents and objectives) is to formulate prescriptive sentences in order to optimize the effects of teaching (Geography)."

And when we come to outline a specific work of research we should think of the following prerequisits:

1 There must be a set of hypothetical effects based on theoretical grounds, e.g. "remedial instruction using various media (slides, films, abstract models) will enforce long-time retention effects because each of the media facilitate multidimensional memory structures."

2 Within our research we must analyse the variations of our treatments, e.g. "given a certain identical geographical content, measure the effects of using only slides versus using slides and abstract model together".

3. Our independent variables (small in number) must be of a kind that the Geography teacher has a real chance to manipulate them, e.g. "the presentation of a given content in form of a black and white sketch or a four-colour topographical map or a multi-coloured, three-dimensional landscape drawing" (and not: variables such as gender, social background etc. of students; only in cases when theory suggests possible differences should we investigate in such variables, e.g. map reading capabilities between boys and girls are significantly different as can be taken from reseach results on intelligence) .

4. Our dependent variables (also small in number) must be such as to measure our hypothetical learning effects, e.g. "correct answers measured as raw points in a given item, or degree of performance measured as time consumed in producing a landscape profile from the basis of a topographical map".

5. Our research must consist in small experiments, e.g. "the variation of 2-4 methodological approaches to introduce map reading " (and not: the whole sum of possible differences of two complete curricula of Geography).

HOW TO PLAN AN EXPERIMENT

Leutner (1988a, 11) gives an illuminating example how to plan and organize an experiment (which for our specific purposes might be imagined to have geographical contents: an ecological model of agricultural landuse in arid zones).

1. Theoretical background

When pupils work with dynamic systems on a computer we can assume that they learn details of the ecological situation presented (geography content) and of the structure of a model (methodological content). There remain two open questions:

a. What role do those rules (algorithms, formulas, correlations) play which are hidden within the model and should be detected by the student? Here we have to recur to theoretical considerations on the learning of rules respectively on the learning by discovery (Egan & Greeno, 1973).

b. What differences in learners' effects do we receive from the typical computer situation where 3-4 students work together compared to the normal learning situation? Here we have to recur to theoretical considerations concerning the principle of cooperative problem solving (Johnson, 1981).

c. Our attention must be drawn to the fact that neither theoretical background comes from Geography but from Paedagogics respectively from Educational Psychology (there is, of course, also a theory of Geography: within the ecological model).

2. Mapping sentence:

High/low learning effects can be explained by

- the high/low intensity
- in which learning contents are presented
- when students work alone/ in groups
- and have to learn rules
- and can be divided in good/low pretest groups.

3. Experimental design

2 x 2 factorial design, analysis of covariance (i.e. 2 x 2 x 20 = 80 students, as a minimum of 20 per cell should be observed). Our independent variables (predictors for learners' effects) are

- information (did students receive information on the implicit rules of our model, yes/no),
- learning situation (did students work in groups or alone).

		information about rules	
		yes	no
learning situation	group	20	20
	alone	20	20

Pretest results and several parameters of steering the model were taken as covariates.
Our dependent variable (criterium) consists of test results (a learning and retention test comprising all system rules, administered immediately after the computer simulation).

4. Possible results

This experiment could guarantee a solid answer to the methodological problem how best to teach a geographical theory: What prerequisits must the teacher think of, how should he organize the learning situation? The results would give practical suggestions for real school situations and make the didactics of Geography an applicable science.

CONCLUSIONS

Our example may have demonstrated that the didactics of Geography is a subdiscipline of general didactics which again is a subdiscipline of educational science. If we agree that our subject is *the science of the institutionalized teaching and learning of* Geography we can define several major tasks:

1. Analyses of general teaching/learning issues with specific geographical contents with a certain danger of trying to invent the wheel again because educationalists, colleagues of general didactics or educational psychology might analyse the same problems only with different subject contents. But we should also see the great chance here for cooperation.
2. Analyses of the specific contents or methods of Geography: Working with maps, atlases, globes, reliefs, models; investigations during outdoor situations, excursions, interviews; working with sketches, drawings of landscapes, of diagrammes; data collection and processing and other techniques mostly and exclusively reserved for Geography.

The aim of our research in this case should be to find out how the specific contents and methods of Geography should be taken into account to optimize learning them.

3. Analyses of detailed sets of geographical objectives with the intention to describe hierarchical trees of difficulties and give indications how and in which order best to proceed in teaching situations. We could then proceed and analyse transfer effects on certain hierarchical levels (within Geography contents or also more general: e.g. understanding of complex models in other subjects).

4. Analyses of teaching methods which are most helpful for our geographical contents and methods, e.g. types of remedial instruction in a computer simulation.

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TEACHING PRACTICE SUPERVISION - USING A DIARY FOR REFLECTION

Frances Slater

In the so called 'softer' forms of qualitative educational research, diary keeping as a method of reflection and insight is being established.

The supervision of teaching practice is a little researched and a rather unknown activity in teacher education. It is unknown in the sense, not of timetables followed and other surface details, but unknown at its deeper levels, i.e. in the nature of the 'meetings' between two people, student and tutor.

In my paper, largely based on particular diary entries of teaching practice supervision, I attempt to reveal my thoughts and concerns recollected after the event.

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In the so called 'softer' forms of qualitative educational research, diary keeping as a method of reflection and source of insights and interpretations is becoming established.

Supervision of teaching practice, on the other hand, is still a little researched and a rather unknown activity in teacher education. It is unknown in the sense, not of timetables followed and other surface details, but unknown at its deeper levels i.e. in the meaning of the 'meetings' between two people, student and tutor.

In this paper, largely based on a particular diary entry of teaching practice supervision, I attempt to reveal my thoughts and concerns, recollected and contemplated after the event.

This example, with its interpretations, begins to reveal the meaning of teaching practice supervision as a personal and human experience which has dimensions and levels of meaning rarely considered in the literature of teacher education.

The diary descriptions and my interpretations form 'data'. The 'data' is offered to others in the spirit of seeking their reactions and interpretations, thus continuing a quest for illumination and further understanding. At the same time, the paper highlights both the value I place personally on diary keeping as a form of research in which process yields product, and the need for exploring in depth teaching practice supervision as one of the central activities in teacher education.

Extract from my diary

27th December

I first thought of keeping a diary last year, as a way of trying to make more sense of teaching practice supervision. I'd seen what I would describe as a rather bad, an awful very early lesson by P_____ who just seemed to let the kids have it all their way. Anything I could say was, I felt, pointless - he had to get himself to square one. I saw it as a poor lesson, a non lesson - the children, only first years, talked, chatted, called out, the noise got greater and greater and he did little to assert himself, to put himself in authority. On reflection, a long way from my sense of great frustration at what I'd seen and feeling that I could not act for him, it seems that possibly his consternation at my observing the chaos paralysed him into inaction. He's capable and personable though I think to be observed without a front could have been painful. It so happened that my subsequent visits during the year were in the afternoon and he drove back with me to central London. His conversations were about a very clever brother, his (P_____'s) unhappiness at boarding school, his sympathy for the underdog in the class. His comments about pupils seemed to show a capacity for identifying with certain children and a real sensitivity and insight into children, based on his ability to imagine he was them. I felt rather overwhelmed by the detail of his diagnoses. Was he really diagnosing so accurately about how they felt or might feel, or was he reliving situations in his own schooldays? Whatever - I listened and was happy to listen. I said little of the lesson observed. It seemed to me then and now appropriate to say little, though I would have given him, on most if not all occasions, something in writing. I remember praising him for his sketching/drawing ability and encouraging him to use it more, but I was always left with the feeling and knowledge that he had set the agenda for our chats. Was this him, or was it a continuing defence against talking over the lesson - my job? Perhaps this diary will show that that's not the job or rather a very narrow view of teaching practice supervision. Would our interaction (characterised by goodwill on both sides) have been the same, given a different first viewing of him in a classroom? Perhaps we should wait to be invited by student teachers into their classes.

Would I then have 'got' into the chats more of my view of lesson planning? Would that have served a purpose, any purpose, even then? Perhaps he was too insecure (he liked to skip the Friday group discussion sessions at the Institute) and he was telling me this by his comments about children, his sympathy for them as individuals and so asking indirectly that I show the same sympathy to him? He seemed to be identifying with some of them so closely - children not understood, children who needed protection, that was the tone of his perspective. So did he need protection from me and my criticisms, protection which he gave himself in those P_____ structured conversations in which I became a learner - about him, his relationship with his brother - admiring of him too and yet learning something else at the same time - a sense of his feeling less than adequate. Yet to listen to him talk about his thesis and all his interest in geography, his capacity to organise and think came alive and I should not have been mildly surprised that he gained a distinction in the final examination. He knew how to perform for a system - he is a capable person - does he feel that though? Is he reasonably enough certain of it? I am left thinking about the person, P_____ the young man, not P_____ the lesson planner, the geography teacher, though my original job description says lecturer in education, with special reference to geography method. What method did I hand on to him? I think I listened (though, enough?). I think I was accommodating, too accommodating? I can't be sure.

It all depends on what stance you take. Phil Salmond's underlining of that metaphor in relation to educational psychology's stance towards schooling in her recent essay (Salmond, 1985) is compelling. What is a proper stance for me to take towards student teachers? As a geography methods tutor should I act as a fully fledged craftswoman, a mistress builder and show my skill at lesson planning, initiate in the tectonics of building units of work for children? Is that always a useful stance though? Is it always the stance which my students can derive most help from? Most support from? P_____ and I sat side by side on those runs back into London. I do hope I gave him a sense that I was alongside him. Yet I also know I felt unhappy that I could not say more in an area in which I felt I was more of an expert than the ones he decided to raise, such as family relationships and seeing inside children. Yet when I visit students I am there for their purposes, not for mine. I think I have to be more aware of not colluding perhaps with their agendas - of making my 'understanding' more explicit at times - "OK you don't want to talk lessons - what shall we talk about, why not the lesson, lesson planning? Can you make the most of me by avoiding, if it's avoiding, those topics?"

Further commentary on the extract

As I read over this first entry, with a view to including it in a conference paper, and some years since I wrote it, I am struck above all else by the description of the lesson as bad and awful. My observations contain the assumptions that one can, as a student teacher, take over someone else's class, and as long as one has a carefully planned lesson and a reasonably 'together' manner, a 'successful' lesson can be delivered. I was certainly frustrated, and I can still recall the intensity of that meeting. I wonder now to what extent this prevented my observing P_____ as the beginning teacher, learning from experience. I now think I saw myself in his place and that my thoughts and interpretations may be partly how I thought I might feel to be observed in an 'out of control' lesson. I think, too, that I very much forgot some of my own difficulties with classes in my first year of teaching - the fourth year class which never really did settle down for me, all year as I remember it now.

I think one of my initial reactions to P_____'s classroom that day - becoming frustrated with myself and him - was not helpful and in fact can be explained because I too quickly put some of myself in his shoes unconsciously, and did not stand apart and see him as separate from my experience and likely reactions. I knew I could not act for P_____ and yet emotionally I was deploring his inability to take actions I thought I would have taken.

I do recall, too, that I had felt weary driving out to see him and I felt disappointed that I'd expended energy to come and see such a lesson.

I think that, overall, one of the effects of diary keeping has been to increase the enjoyment and meaning I get out of teaching practice visits. Very often they were a tiresome, very tiring chore and duty. Now I feel I am going out to visit a person I'm looking forward to seeing and I think of myself as going out to support, rather than to give advice. This takes a lot of pressure off me and off the students too I should think. I have had an excellent group of students this year, of whom I think only one persists in seeing me as an evaluator, and she continues to feel uneasy about my seeing her lessons.

In some ways keeping the diary has changed my attitude to teaching practice supervision. I feel more relaxed about it and less downcast by noisy lessons in which little learning seems to take place. I am thinking of a recent visit to E_____, when the class were very inattentive, and she was improvising with someone else's lesson plan. I took a boy out and up to the office. I made notes for her based on my observations - without any negative value judgments - such observations as 2 boys talking etc. etc. Afterwards we talked about where I'd taken the boy - up to the office and a year head, and I asked her where the class teacher had been. We then spent most time talking about the content of the lesson and some of the negative messages it could be giving about third world cultures. I had exchanged some remarks in the course of the lesson with a girl very scornful of "all those pregnant worn out women", which nicely illustrated the point I was raising with E____.

The conversation with the pupil had gone like this:

Girl: Why don't they learn. Why don't they use contraceptives. They're stupid. The women are always worn out and pregnant.

Me: They don't see it like that. That's how we see it.

No effect on girl. I'm marked out as equally stupid.

Me: (trying again). They do need children to work as breadwinners and as support in old age.

The pupil still looks sceptical and sure of her own view.

Me: We also have to remember that our own grandmothers and great grandmothers were in the same position - lots of children.

Total look of disbelief on pupil's face turning into a food for thought look.

The story impressed E____. As I left, and she was thanking me for coming, I felt she would also be thinking over other aspects of the lesson. In my judgement there was some, but not a lot of defensiveness around in relation to the lesson. I felt (I did ask - "how would you replan it?") that E____ would think over the lesson again.

I have moved from P____ to E____ and from a statement about the value of diary keeping for me, to specific incidents. The specific incidents do not, in themselves, validate my statements but as I recall that recent lesson of E____'s (at the end of the second teaching practice) and our chat afterwards, I feel more positive about any effects visits may have. My questions and actions and comments may provide something for E____ and others to reflect on. Diary keeping gave me an opportunity to reflect and I am now more conscious of trying to help students reflect.

In this paper I have used an extract from my diary to comment on an episode in teaching practice supervision. I believe that the diary keeping gave me an opportunity for reflection which led to a fundamental change in my view of the aim of teaching practice supervision, as my commentary above on the diary extracts indicates. The move from an advice role to a more supportive role is, I believe, a significant one for me and it may give others an opportunity for rethinking attitudes to teaching practice supervision.

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AN ANALYSIS OF GEOGRAPHY QUESTIONS IN THE HONG KONG CERTIFICATE OF EDUCATION EXAMINATIONS SINCE 1970

Betty L.L.L. Yau & Yee-wang Fung

ABSTRACT

The paper analyses geography questions set in the Hong Kong Certificate of Education Examinations (public examinations at grade 11 level) since 1970. It aims to identify changes that have taken place with regard to the importance attached to the affective domain and the relative importance attached to different levels of objectives within the cognitive domain. The essay and multiple-choice questions are also compared in this regard. The educational implications are then discussed in the light of the findings.

INTRODUCTION

In comparison with the Western world, education in Hong Kong is highly examination oriented (Fung, 1986). Public examinations in general, and the Hong Kong Certificate of Education Examination (HKCEE) in particular, play a very important role in education in Hong Kong (Gibby, 1978; Yeung, 1985). The HKCEE virtually dictates the CONTENT and PROCESS of LEARNING and TEACHING at secondary level. This is chiefly because success in this examination opens the door to further education and better employment opportunities.

Since the HKCEE has such a strong effect on the content and process of learning and teaching, it is important that the questions are instrumental to the realization of the aims of education. The aims of geographical education, as spelt out in the Regulations and Syllabuses of the Hong Kong Certificate of Education Examination (Hong Kong Examinations Authority, 1984), are to help pupils develop:

(1) an integrated understanding of the basic concepts of geography;
(2) skills and abilities for finding solution to problems and interpreting data in various forms; and
(3) positive attitudes towards the environment, community and mankind.

It is apparent that the first two aims belong to the cognitive domain and the third, to the affective domain. The educational objectives in these two domains have been categorised by Bloom et al(1956) and Krathwohl et al(1964). Bloom's taxonomy of educational objectives in the cognitive domain has been frequently adopted in the analysis of test items in geography (Cox: 1966; Monk: 1971) as well as in other subjects (Siu et al, 1975; Tam, 1975). According to Bloom, educational objectives in the cognitive domain may be divided into six major categories, namely, knowledge, comprehension, application, analysis, synthesis and evaluation.

The present study attempts to analyse the educational objectives of the HKCEE geography questions since 1970. More specifically, it aims to find out:
(1) the importance attached to the affective domain;
(2) the relative importance attached to the different levels of objectives within the cognitive domain;
(3) the changes that have taken place since 1970 with regard to the above two aspects.

METHODOLOGY

Geography in the HKCEE consists of two papers: the multiple-choice (MC) paper, which carries 40% of the weight;

and the essay paper, which carries 60% of the weight. In the present study, both papers were analysed and their scores were combined in the same ratio.

A table of specification adapted from Bloom and Krathwohl was used for the analysis. Cognitive objectives are classified into six major categories as stated above, but the affective objectives are not differentiated because they comprise only a small percentage of the questions set in the geography papers.

All questions on both papers set in alternate years from 1970 to 1986 were analysed independently by the authors and a research assistant. The former are experienced trainers of secondary school geography teachers, and the latter was a distinguished student of the full-time graduate teacher training programmme in the year 1986-87. The investigators had a one-hour sharing and practising session together before beginning to analyse the questions. The MC papers were analysed first, in reverse chronological order. The essay papers were then analysed in the same order. On completion of each paper, the three investigators compared their results. Any differences in opinion were discussed until a general consensus was reached.

While analysis of the MC papers was based on the questions themselves, analysis of the essay papers was based on both the questions and the marking schemes provided by the Examinations Authority. The marking scheme lists essential points to be included in each answer together with marks to be allotted for each point. Each question, or answer, was analysed for cognitive and affective objectives separately.

As an example, the marking scheme of an essay question may include 20 points carrying one mark each. Out of these 20 points, 4 may belong to the cognitive objective of comprehension, 10 to that of application and 6 to that of analysis. At the same time, 5 of these 20 points may also deal with the affective aspect. These marks were entered into the table accordingly.

The marks in each column were then added up separately and expressed as percentages of the year's total. It is believed that treating the data this way enabled the researchers to compare the scores within a given year as well as to identify the trend of development over the years.

RESULTS

The results of the study are reported below with the help of three tables.

Table 1 shows the overall scores, expressed in percentages obtained by combining the scores of the MC papers and those of the essay papers in the ratio of 2:3. It can be seen from the table that although not many questions are set on the affective domain, there has been a gradual increase in emphasis on this area over the years. In 1970 only 0.50% of the questions dealt with the affective domain whereas by 1986 the percentage had risen to 10.36%.

With regard to the cognitive domain, the trend is quite obvious. There has been a fairly steady decrease in the number of lower order questions and a gradual increase in the number of higher order questions. While questions set at the levels of knowledge and comprehension dropped from

15.40% and 54.40% in 1970 to 2.92% and 44.53% in 1986 respectively , those set at the levels of analysis and synthesis rose from 14.90% and 0.00% in 1970 to 32.14% and 5.09% in 1986 respectively . It may also be noted that whereas the number of questions set at the level of application has fluctuated within a fairly wide range in the past sixteen years, no question set at the level of evaluation has yet appeared.

Table 1. PERCENTAGES OF QUESTIONS SET ON THE AFFECTIVE DOMAIN AND AT DIFFERENT LEVELS OF THE COGNITIVE DOMAIN IN THE HKCEE GEOGRAPHY MC AND ESSAY PAPERS FROM 1970 TO 1986

Year	Affective	Cognitive					
		Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
1986	10.36	2.92	44.53	15.32	32.14	5.09	0.00
1984	9.78	5.49	42.53	18.57	30.22	3.19	0.00
1982	13.40	3.30	38.74	26.74	27.32	3.90	0.00
1980	8.07	3.27	54.65	30.36	9.54	2.19	0.00
1978	6.38	3.05	58.22	18.08	19.15	1.50	0.00
1976	5.48	4.35	53.08	17.76	23.60	1.20	0.00
1974	4.43	9.30	48.65	18.74	21.23	2.08	0.00
1972	2.16	19.82	42.84	27.38	9.96	0.00	0.00
1970	0.50	15.40	54.40	15.30	14.90	0.00	0.00

When the scores of the MC papers alone are examined, two turning points are clearly discernible: one between 1974 and 1976; the other between 1982 and 1984. Table 2 shows that the number of questions dealing with the affective domain rose from 1.47% in 1974 to 4.69% in 1976 and from 3.51% in 1982 to 9.62% in 1984. It also shows that in the cognitive domain, there was a sudden drop in the number of questions set at the knowledge level which reduced from 17.65% in 1974 to 9.38% in 1976. This was balanced by an increase in those set at the analysis level which rose from 1.47% to 12.50%. The latter further increased from 15.79% in 1982 to 21.15% in 1984. Prior to 1984, there were virtually no questions set at the synthesis level, but in that year, such questions constituted 3.85% of the paper and this figure further rose to 9.43% in 1986.

Table 2: PERCENTAGES OF QUESTIONS SET ON THE AFFECTIVE DOMAIN AND AT DIFFERENT LEVELS OF THE COGNITIVE DOMAIN IN THE HKCEE GEOGRAPHY MC PAPERS FROM 1970 TO 1986

Year	Affective	Cognitive					
		Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
1986	9.43	5.66	39.62	22.64	22.64	9.43	0.00
1984	9.62	3.85	40.38	30.77	21.15	3.85	0.00
1982	3.51	5.26	42.11	36.84	15.79	0.00	0.00
1980	5.17	5.17	58.62	24.14	10.34	1.72	0.00
1978	4.69	3.13	57.81	23.44	15.63	0.00	0.00
1976	4.69	9.38	54.69	23.44	12.50	0.00	0.00
1974	1.47	17.65	58.82	22.06	1.47	0.00	0.00
1972	0.00	14.74	62.11	21.05	2.11	0.00	0.00
1970	1.25	22.50	57.50	16.25	3.75	0.00	0.00

As for the essay paper, Table 3 shows that the demarcation line lies between 1972 and 1974. Although the overall change in the affective domain has been very gradual, the rise from 3.60% in 1972 to 6.40% in 1974 may still be considered comparatively sharp. In the cognitive domain, the number of questions set at the knowledge level dropped sharply from

23.20% in 1972 to 3.73% in 1974 and those set at the synthesis level emerged from 0.00% to 3.47% in the same period. This finding confirms that of an earlier study by Yau et al (1975).

Table 3: PERCENTAGE OF QUESTIONS SET ON THE AFFECTIVE DOMAIN AND AT DIFFERENT LEVELS OF THE COGNITIVE DOMAIN IN THE HKCEE GEOGRAPHY ESSAY PAPERS FROM 1970 TO 1986

Year	Affective			Cognitive			
		Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
1986	10.99	1.10	47.80	10.44	38.46	2.20	0.00
1984	9.89	6.59	43.96	10.44	36.26	2.75	0.00
1982	20.00	2.00	36.50	20.00	35.00	6.50	0.00
1980	10.00	2.00	52.00	34.50	9.00	2.50	0.00
1978	7.50	3.00	58.50	14.50	21.50	2.50	0.00
1976	6.00	1.00	52.00	14.00	31.00	2.00	0.00
1974	6.40	3.73	41.87	16.53	34.40	3.47	0.00
1972	3.60	23.20	30.00	31.60	15.20	0.00	0.00
1970	0.00	10.67	52.33	14.67	22.33	0.00	0.00

DISCUSSION

The above results reveal that although the affective domain has been given an increasing amount of attention in the HKCEE in recent years, there is still much room for further improvement. The plea for more questions on the affective domain stems from the conviction that geographical education should "move from a factual orientation to an orientation concerned with concepts, methods and values" (Ambrose, 1973, 71) and that "students cannot avoid coming up against questions of values and attitudes" (Naish, 1980, 63).

in the cognitive domain, there has been a concentration of questions aiming at the levels of comprehension, application and analysis. This is considered appropriate because it meets the needs of the young people who are about to leave school and suits their level of cognitive development (Biggs, 1987).

The data also demonstrate clearly that there has been a decrease in the number of lower order cognitive questions and an increase in the number of higher order ones during the period under consideration. Two turning points are observable. The first one, which occurred around 1974, might have been caused by the drastic change in the 1975 syllabus which placed less emphasis on regional geography than the old one. Since there is a tendency for regional geography to be taught and examined in a more factual manner, the publication of the 1975 syllabus in 1973 might have had some psychological effect on the setters of the 1974 essay paper. The second turning point occurred around 1982 which might have been the combined result of the introduction of an explicit statement on cognitive and affective objectives in the HKCEE syllabus in 1981 (Hong Kong Examinations Authority, 1981) and of the implementation of a new Advanced Level geography syllabus which was built on the landscape and ecological paradigms (Hong Kong Examinations Authority, 1979). This syllabus was first examined in 1981. It seemed that these two measures have encouraged the examiners to place more emphasis on the affective and high level cognitive objectives.

The data obtained in the present study also reveal that in the essay papers the examiners tend to ask more cognitive questions at the analysis level than at the application level whereas it is the other way round in the MC papers. This phenomenon probably reflects the policy of the Hong Kong Examinations Aurhority as well as the relative strength of the two types of questions in assessing different levels of cognitive objectives.

When Tables 2 and 3 are compared, it is found that the MC papers exhibit a more steady trend of development than the essay papers. This is because the MC questions are normally selected from a pool of pre-set questions and are therefore less affected by the personal inclination of the examiners whose influence is more noticeable in the essay papers.

CONCLUSION

It has been shown in this paper that the influence of public examinations on learning and teaching cannot be overstressed in Hong Kong. It is however encouraging to note that the geography papers in the HKCEE have improved steadily over the years, keeping pace with the development of the curriculum.

The paper argues that these improvements are largely the results of innovations in the curricula. The assertion that "before assessment can begin, there is a basic need to define objectives clearly" (Hones, 1973, 115) has also been borne out by the present findings.

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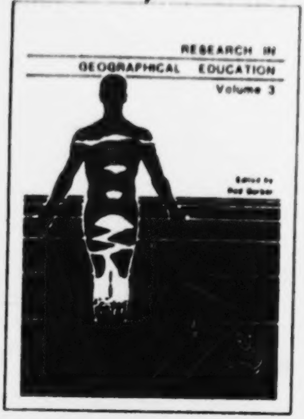

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GEOGRAPHICAL EDUCATION COMMISSION

SKILLS IN GEOGRAPHICAL EDUCATION SYMPOSIUM '88

Brisbane, August 14 - 20, 1988

PROCEEDINGS - Volume 2

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Volume 2

Papers presented to the Symposium

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ASSESSMENT SKILLS - THE TRAINING OF RATERS IN GEOGRAPHY EDUCATION

Roy Ballantyne & Ross Sparks

ABSTRACT

Assessment training should ideally engage geography teachers in an interactive process exposing individuals to the strategies of their peers as well those of an 'expert'. A study was undertaken to test a regression model designed to encourage such interaction. The research results indicate the value of the model in enabling comparative analysis of teacher assessment strategies and the success of counselling in enhancing assessment skills.

1. INTRODUCTION

Many texts in geography education deal with the topic of evaluation (Graves, 1975, 1982 ; Jay, 1981 ; Marsden, 1976 ; Slater, 1982 ; Walford, 1981). In these, attention is given to different methods of assessment strategies as well the validity and reliability of tests. It is noticeable, however, that no suggestions are made regarding the practical training of teachers in marking skills. Walford (1984, p. 118) alludes to this lack of concern when he remarks that *"it's strange how little has been written about marking in geography amidst all the bright ideas and erudition which straddle the pages of Teaching Geography"*.

Due to a lack of training in assessment skills many teachers feel unsure of their competence as evaluators. This is particularly true of beginning teachers. Deep-down they realise that it is difficult to justify grade differences especially when assigning impression marks to essays. This insecurity is further aggravated in multi-cultural environments where perceptions of what is of value may vary resulting in claims of bias. Geographers, dealing as they do with value laden issues, are obviously sensitive to such claims.

Geography teachers can no longer afford to let evaluation remain a neglected part of the task of teaching (Bentley, 1981; Lloyd Jones, 1986). There is a need to develop assessment skills in order to maintain standards, improve the quality of feedback to students and ensure the absence of bias relative to any cultural group. To achieve these goals, geography teachers must be willing to expose their marking strategies to scrutiny and peer review (Walford, 1984).

2. THE USE OF A REGRESSION MODEL IN DEVELOPING MARKING SKILLS

In response to the need for practical assessment training , at both pre and in-service levels, a regression model was devised to detect differences in teacher marking strategies as well as the presence of cultural bias (Sparks and Ballantyne, 1987). The model analyses teacher strategy relative to that of an expert thereby indicating where improvement is needed. This study demonstrates the application of the model in teacher training and evaluates its use in developing practical assessment skills. The detailed nature of the model is presented in Sparks and Ballantyne (1987) and is not covered here. The computer programs are available on request from the authors.

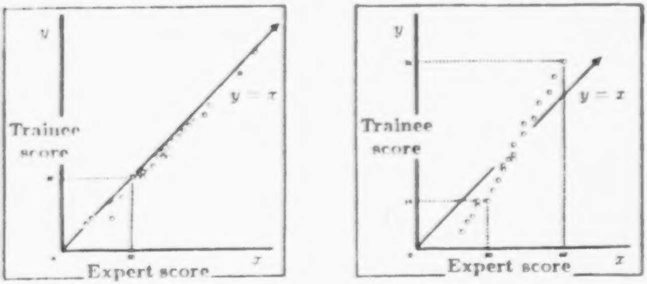


Figure 1a Trainee's strategy is equal to the expert

Figure 1b Trainee is more discriminating than the expert

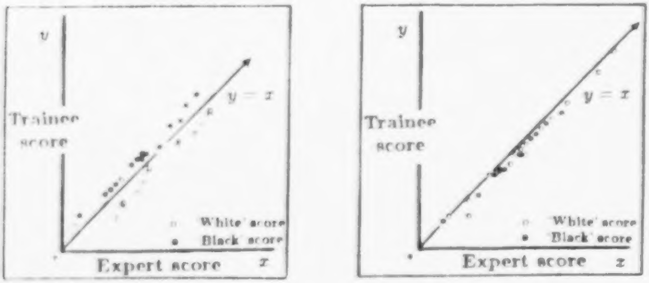


Figure 1c Trainee's strategy is biased relative to the expert

Figure 1d Trainee is unbiased

Figure 1. Examples of possible trainee strategy

Assuming that x and y represent the scores of an expert and another assessor respectively, then it can be supposed that where $y = x$ for all assessments, equal strategies are employed. In Figure 1 the 'o' points represent the co-ordinates $(x; y)$ of marks given to an answer by an expert and another assessor. Figure 1a indicates a situation where an expert and another assessor employ similar strategies. This is seen by the relatively close positioning of the 'o' points to the line $y = x$ (expert). Figure 1b indicates a situation where the expert and another assessor differ in strategy. In this example, the assessor inflates the marks of good answers and depresses the marks of poor answers relative to those of the expert.

The regression model is extended to allow the identification of cultural bias in assessors. This is achieved by determining whether strategy differences exist where an individual assesses work originating from two or more cultural groups. Figure 1c illustrates a case of bias where an individual consistently rates individuals from one cultural group below that of another and Figure 1d the expected situation where no bias is present.

The regression model was used in the training of five post-graduate students (one 'Black' and four 'White') enrolled in a geographical education course at the University of Cape Town. The students were required to mark the work of twenty, first year geography candidates. Twelve of these were 'Black' candidates and eight 'White'. Each candidate had answered three essay questions relating to different sections of the first year course, viz. environmental perception, economic and urban geography (questions 1 to 3 respectively). The reason essay type questions were chosen was that these "*are very difficult to mark in a way which is entirely fair to candidates. No matter how carefully the questions are chosen and worded, markers will differ in their assessment of answers*" (Graves 1982, p 351). This question type is thus ideally suited for use in assessment training.

The names of candidates were removed from examination scripts as were any marks or comments made by the examiners. Any bias identified may, therefore, be presumed to be subjective in its nature. Such an occurrence could be explained by the fact that students had been educated in a segregated school system which by its nature is unequal in both provision and standards of education (Hartshorne, 1986).

After students had marked all the scripts their scores were subjected to the regression model and their strategies compared with that of an expert (in this case the experienced lecturer who marked each particular section of work in the examinations). The regression model identified differences between students and the expert in terms of scale (spread of marks), location (mean score shift) and bias. On the basis of these differences students were counselled regarding improvements which could be made to their marking strategies. Counselling was done without reference to individual scripts. Within three weeks of counselling, students re-marked the scripts and their scores were again compared with those of the expert. In this way success of both the model and student counselling in aiding the development of marking skills was evaluated.

2.1 Application and Interpretation

The regression model yielded differences between student and expert marks in relation to scale, location and bias. The estimated scale parameter (slope) generally varies between 0 and 1. The closer the estimated parameter is to 1 the greater the similarity in the spread of student and expert marks. If the estimated scale parameter equals zero this indicates that student strategy is unrelated to that of the expert, i.e. the student gives the same mark for all scripts.

The estimated location parameter is affected by the scale and generally cannot be interpreted unless the estimated scale parameter for two comparing strategies are equal. This situation is uncommon, but when it occurs, the location parameter is useful in the detection of bias (Figure 1c and 2a).

In this study it was decided to counsel students where it was found that they:

(i) had an overall estimated scale parameter of less than .7

(ii) had an overall estimated scale parameter greater than .7 and an estimated location parameter of greater than 40 or less than 10

(iii) exhibited bias by using different strategies in the marking of scripts from different cultural groups, viz. a relative location shift of greater than 3% between groups.

Using the criteria above only one student was found to require no counselling (Student 5). Of those remaining, three required counselling in terms of scale (Students 1, 2 and 4) and one in terms of scale and bias (Student 3).

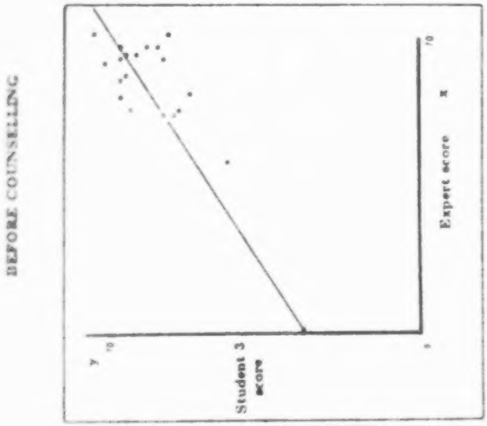
Student estimated scale and location parameters before and after counselling are shown in Table 1. The estimated scale parameters for Students 1 to 4 indicate that they are hesitant to award extremely high or low marks. This illustrates insecurity in their marking strategies resulting in the adoption of a tentative approach and the award of marks in a narrow range. This is most clearly seen in the marks awarded by Student 2 for scripts in question 3 (Table 1). In this instance the marks awarded by Student 2 for the 20 scripts ranged from 67% to 70% (estimated scale parameter = .023) while the expert's marks ranged from 5% to 82%.

Table 1. Marking strategies reported by recording the estimates of the scale and location parameters

		STUDENTS STRATEGIES								
		BEFORE COUNSELLING					AFTER COUNSELLING			
Question	Estimated Parameter	Student					Student			
		1	2	3	4	5	1	2	3	4
1	Scale	.377	.214	.547	.848	.987	.820	.868	.848	1.110
	Location	42.0	49.8	29.4	13.2	3.6	10.3	11.0	17.0	1.0
2	Scale	.500	.092	.852	.767	.927	.648	.312	.748	1.020
	Location	34.6	60.1	9.7	10.6	9.2	24.3	39.3	15.8	0.0
3	Scale	.254	.023	.311	.290	.532	.405	.172	.374	.761
	Location	48.4	66.8	43.6	40.1	29.0	39.5	37.2	43.8	11.8
Overall	Scale	.325	.060	.439	.522	.726	.536	.389	.539	.932
	Location	44.8	61.8	35.4	28.3	19.5	30.1	37.2	32.7	6.5

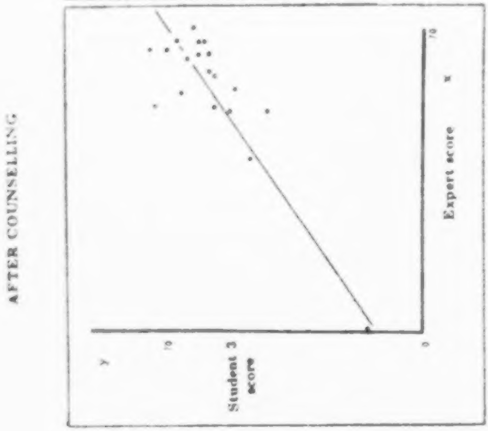
Student 3, schooled in the 'White' educational system, exhibited cultural bias in his marking strategy. This is most clearly seen in his marking of scripts from question one (Figure 2a). Overall, Student 3 was found on average to have a 4% difference between marks awarded to 'Black' and 'White' candidates.

After counselling, Students 1 to 4 re-marked the scripts. It is noticeable that in only one case out of twelve (Student 3, question 2) was there no improvement in student's scale parameters(Table 1). From Table 1 it is seen that Student 2 shows a great improvement in estimated scale and location parameters although his strategy remains distant from that of the expert indicating a need for further training. Student 4, on the other hand, has improved his strategy sufficiently to require no further training, i.e. there is now little overall difference between his strategy and the expert as indicated by estimated scale and location parameters. Student 3 did not reflect any bias after counselling (compare Figure 2a and 2b). This student reflected the least improvement in scale but this may have been due to the fact that he was concentrating on eliminating bias from his strategy. A distance measure of student marking strategy from that of the expert is obtained by using the regression lines and summing the squared distance between the expert's scores and an estimate of scores relating to that of the student. This measure was calculated for each student using before and after estimated parameters



BEFORE COUNSELLING

Figure 2a



AFTER COUNSELLING

Figure 2b

● 'Black' score ○ 'White' score

Figure 2. Student 3 and expert assessment scores

thus allowing overall percentage improvements in strategy to be derived (Table 2). Using this measure it is noted that Student 4 has improved the most i.e. by 96% on the before difference relative to the expert. The average overall improvement for the four students was 58% which indicates the value of the regression model and counselling procedure followed in this study in developing marking skills.

Table 2: Percentage improvement on student's strategy after counselling

	STUDENT				Average PI
	1	2	3	4	
Percentage Improvement (PI) calculated as follows: $PI = \frac{DB-DA}{DB} \times 100\%$ where: DB and DA denote the distance of student's strategy from the expert's before and after counselling respectively	55.9%	64.6%	15.1%	95.9%	57.9%

3. DISCUSSION AND CONCLUSION

The value of training in practical assessment skills in geography education has been demonstrated above. The results indicate the importance of training geography teachers in marking skills where evaluation requires the assessment of pupil's creativity, imagination, problem formulation, problem solving, decision-making and attitudes. Training is even more essential where teachers operate in a multi-cultural environment where it is important to ensure that marking is fair and equitable.

The regression model applied in this study is a useful aid in identifying problems in marking strategy and is a suitable diagnostic tool in the training of geography teachers. Teacher educators wishing to use the model in their training programme need to:

(i) identify the question type in which individuals need assessment training. Although this study has only addressed training in the marking of essay type questions, the procedure should prove valuable using any question type where pupils are expected to "*think divergently, to be creative, to express individuality, to hypothesise and speculate*" (Bray, 1986, p 71).

(ii) present the questions to a large group of mixed ability pupils from different cultural groups.

(iii) arrange for an expert, or perhaps more suitably a panel of experienced teachers, to mark pupil answers.

(iv) select a range of answers (poor to good) to be used in training. These answers should not be chosen randomly but selected to include a spread of marks within each cultural group. At least eight marks are needed for each group in order for the model to determine the presence of any subjective bias.

(v) present the selected answers (not arranged in any order) to the trainees for marking. Using the regression model assess their strategies and counsel accordingly. One of the problems involved in the study above was that students sometimes felt threatened by the counselling process. However, counselling could occur in a less threatening manner using peer group discussion. In this process case studies encompassing typical strategies and problems could be discussed within groups. Trainees would be able to identify the strategy similar to their own and apply the remedial action suggested by the group. An advantage of the above process is that individuals are exposed to a number of different strategies and not just their own.

(vi) organise the re-marking of scripts and, using the regression model, detect any improvement in strategies relative to the expert.

Although the training procedure above suggests the use of group discussion in the counselling process it is possible to train individuals using an interactive, computerised system. Pupil answers to a question could be presented on a computer screen or printout and marked by the trainees. These marks could be punched into the computer which would then estimate the regression parameters and plot expert and trainee strategies on a screen. This information could be used by individuals to adjust their strategy and by repeating the procedure, check for improvement.

In conclusion, this study has shown that through the use of a regression model individual marking strategies converge through time. Training accelerates the process ensuring that the convergence ultimately reflects a strategy close to that of an expert. It is suggested,therefore that the model can play an important role in initiating and facilitating the kind of teacher discussion which Walford (1984) feels is essential if geographers are to improve their assessment skills.

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BUILDING COMPETENCE AND CONFIDENCE THROUGH INSTITUTES, CONFERENCES, AND WORKSHOPS FOR TEACHERS: THE ROLE OF THE GEOGRAPHIC ALLIANCE MOVEMENT

Mark H. Bockenhauer
Donald J. Zeigler

Abstract:

Organized nation-wide efforts in geography to disseminate exemplary teaching strategies have spurred a new era of interest in institutes, workshops, and conferences for teachers. Using examples from Geographic Alliance states of the US, we provide an overview of programs that have been successful in improving the competence and confidence of K-12 teachers in geographic content, materials, and methods.

Introduction:

In the USA the convergence of several favorable circumstances has created a window of opportunity for the revitalization of geography in the curriculum. The National Geographic Society, which was founded 100 years ago "for the increase and diffusion of geographic knowledge," has taken the leadership role in elevating the status and effectiveness of geographic education through its Geography Education Program (GEP), in existence since 1985.

1. By working through the media it has made the American population increasingly aware of and increasingly dissatisfied with the all-pervasive status of geographic illiteracy as it has been documented in various surveys over the past decade, and as it has been contrasted with the superior international knowledge of students in other nations (Grosvenor, 1984, 1985).
2. By working through the political leadership at state and national levels, including Governors, Senators, Representatives, and the Secretary of Education, it has made critical policy-makers aware of the potential contribution which geography can make to a nation intent on becoming more international in outlook and more competitive in the international marketplace (Southern

Governors' Association, 1987; US Congress 1987).

3. By working with the other leading geographical organizations--Association of American Geographers, National Council for Geographic Education, and American Geographical Society--in a consortium known as the Geographic Education National Implementation Project (GENIP), it has participated in developing the academic foundation for a revitalized geography through the publication of _Guidelines for Geographic Education_ (Joint Committee on Geographic Education, 1984), which offers a succinct rationale for geography's place in the K-12 curriculum, a sequence for learning geographic content and skills, and a core of five themes around which geographic education should be built.
4. By establishing the _NGS Education Foundation_ in January of 1988 with a $20 million initial endowment, the promise of additional matching funds, and an eventual goal of $100 million, it has challenged the private sector (corporations, foundations, and individuals) to help build a permanent base of support for geographic education as an investment in American democracy and international competitiveness (National Geographic Society, 1988).
5. And, by working with teachers and administrators throughout the country, it has mounted the challenge of effecting change in the nation's _classrooms_, the crucibles of the twenty-first century (Salter, 1986).

The foundation for active outreach of the Geography Education Program is a network of 22 _Geographic Alliances_ as of 1988. Each alliance is a partnership of university faculty, K-12 teachers, school and university administrators, professional geographers and interested citizens. Most are organized at the state level with NGS providing technical and financial support for alliance operations. In the years 1985-1987, in fact, NGS dedicated nearly $9 million to its Geography Education Program. State governments and the private sector have also been generous in providing additional funding, often on a matching basis.

Diffusion Through Institutes, Conferences, and Workshops:

While the activities of Alliances are extremely diverse, the goal of encouraging the diffusion of both time-tested and innovative curriculum and teaching strategies is well served by institutes, conferences, and workshops. These settings provide effective venues for improving the competence and confidence of K-12 teachers by stressing both geographic content and teaching methods. In general, participants are expected to use their new-found knowledge and skills not only in their own classrooms, but also in professional development activities for their colleagues. Because geography is found as a distinct subject in few US schools, participation is encouraged by not only geography teachers but also teachers of other subjects. The twin goals are the emergence of separate geography courses at all grade levels and the integration, or infusion, of geography into other subjects from math to history to literature. A sampling of the types of institutes, conferences, and workshops is offered in the sections to follow.

A. NATIONAL GEOGRAPHIC SOCIETY SUMMER GEOGRAPHY INSTITUTE:

The NGS Summer Geography Institute (SGI) has been held annually since 1986 at the Society's headquarters in Washington, D.C. Sixty-five K-12 teachers attend, selected through a highly-competitive process from Geographic Alliance states. Participants receive stipends and, if desired, academic credit. This four-week institute consists of morning lectures on major geographic themes, and afternoon sessions devoted to workshops that demonstrate effective teaching materials and techniques. Urban and rural field trips are an integral part of the institute, as is the professional/social interaction among participants, university faculty, and NGS staff. Teachers also acquire the leadership and presentation skills needed to fulfill the requirement that they conduct at least three in-service workshops for their peers in their home states. Through this "multiplier effect" these teacher-consultants spread the benefits of their Institute experience throughout the Geographic

Alliance network: 65 teachers each teaching 3 workshops in which 20 teachers are in attendance reach a total of 3900 teachers. Experience has shown that most SGI participants conduct more than the requisite three in-service workshops. In addition, many have become active in curriculum-writing and materials development, in presentations to school boards, educational, and civic organizations, and in pursuing advanced geography study.

B. SATELLITE SUMMER GEOGRAPHY INSTITUTES:

The Geographic Alliances that operate at the state level also organize institutes patterned after the national SGI. These 2-to 4-week "satellite" institutes provide academic credit and an opportunity for K-12 teachers to refresh their knowledge of geographic themes, develop and test new lesson plans, and learn to integrate more geographic content into other areas of science and humanities instruction. These institutes often have syllabi tied to state curriculum requirements and regional issues. They are sponsored in part by funds from NGS and in part by funds from local or state entities such as universities, Governors' offices, state education departments, foundations, and corporations. Graduates of the national SGI play a leadership role in designing and teaching at these satellite institutes. Additional NGS criteria for co-support of a satellite institute include: a minimum of 20 participants, a minimum of 80 contact hours, an in-service training component, participant lesson plan presentations, small group "investigations" to explore effective methods of integrating lecture content into K-12 classrooms, evaluative mechanisms, and arrangements for participants to receive graduate or "salary" credit.

During the summer of 1987, five Geographic Alliances conducted a total of nine Satellite Summer Geography Institutes for a total of over 250 K-12 teachers. As of the beginning of 1988, as many as 15 SSGIs are planned, contingent on adequate financial and institutional funding.

C. CURRICULUM CONFERENCES:

Geographic Alliances may also conduct intensive regional conferences to examine the scope and sequence of geography required in state and local curricula. These are called PLACE conferences, which stands for People, Location, Attitude, Change, Environment. They provide an important opportunity for teachers and university faculty to meet with state education officials to discuss how geographic content can be improved and infused into other K-12 disciplines such as history, social studies, science, and languages.

1. In 1986, the California PLACE Conference was organized by the California Geographic Alliance with support from UCLA, the California Department of Public Instruction, and the National Geographic Society. This curriculum conference was attended by about 150 educators and public officials.
2. In 1987, the Rocky Mountain PLACE Conference was organized by the Colorado Geographic Alliance with support from the University of Colorado--Boulder, the Western Governors' Association, and the National Geographic Society. It was attended by about 160 people.

D. GEOGRAPHIC ALLIANCE WORKSHOPS:

Short workshops are often sponsored by Geographic Alliances to foster improved K-12 geography teaching among those who have not been able to attend either national or satellite institutes. They may range from a 1-1/2 hour after-school or at-school session to a 2- or 3-day workshop far removed from the classroom setting. Instruction may be provided by academic geographers, by classroom teachers, or by a combination of the two. Graduates of the SGI and the SSGIs are often involved in leading these workshops. Some examples of successful Alliance-sponsored workshops follow:

1. A series of county-wide workshops were conducted by the Kentucky Geographic Alliance, co-sponsored by grants from NGS and South Central Bell Telephone. By January 1988, 18 of these 2- to 4-hour workshops had been offered free-of-cost to over 500 elementary teachers throughout the state.

Workshops were led by a professional geographer teamed with one of five Kentucky SGI graduates. They focused on the new state geography curriculum for 4th and 6th grades. These workshops have been enthusiastically received by teachers, and at least 7 more are scheduled under this grant.

2. A 3-day "retreat" workshop was conducted by the Minnesota Alliance for Geographic Education at a remote northern Minnesota nature center. Thirty-five K-12 teachers came from across the state to participate in content lectures and teacher presentations, focusing on state environmental issues such as acid rain, water quality, and forest use. The nature center facilities and staff were employed for field work activities ranging from hands-on water quality testing to orienteering. This intensive event was so well-received by teachers that it has been made an annual alliance activity.
3. A 3-day workshop for 45 Missouri teachers and administrators was hosted by the Missouri Geographic Alliance. This workshop attempted to convince school and school-district decision-makers of the importance of enhanced geographic education. SGI graduates made presentations of effective lesson plans, and several university geographers lectured on fundamental geographic themes and the goals of the Alliance movement. The targeting of administrators is an aspect of Alliance work not to be overlooked, for this group can help effect lasting change.
4. A series of 3 weekday evening workshops was sponsored by the New Jersey Geographic Alliance. Each 3-hour session featured at least two SGI graduates presenting hands-on lesson plans, and an alliance-provided dinner. Two workshops were held on university campuses and one at an elementary school.

E. 'TEACHING GEOGRAPHY' WORKSHOPS:

A recent addition to the Geography Education Program is "Teaching Geography: A Model for Action in Grades 4-12," a program funded in part by the US Department of Education's National Diffusion Network. Teaching Geography provides an array of materials (curriculum guidelines and a handbook) and services (teacher-training workshops) to reach an audience of teachers within and beyond the existing Geographic Alliance Network.

Teaching Geography's primary service consists of in-service workshops to support the use of the geography curriculum guidelines and a teachers' handbook entitled A Model for Action, which contains sample lessons, an annotated bibliography of teaching exercises and aids, a list of geography teaching resources, and information about on-going services and opportunities. These on-site workshops are available to introduce educators to geography content and successful teaching techniques. Ideally, they are organized for 20-50 educators of grades 4-6 or 7-12. Workshops are staffed by a team of two experienced teachers, experts selected from the pool of NGS geography teacher-consultants, and from among professional geographers affiliated with the NGS Geographic Alliances. A Program co-ordinator works with this team and with a "local facilitator" to tailor a workshop to specific local curricular needs. Workshops are offered for $25 per participant per day. All educators who adopt Teaching Geography materials or workshop services are offered the on-going support services of the Geography Education Program.

F. WORKSHOPS AT PROFESSIONAL CONFERENCES

Annual professional conferences of geographers and educators provide additional opportunities for encouraging the diffusion of materials and methods in geography teaching.

1. In the realm of geographic education, the National Council for Geographic Education provides a forum for reaching both K-12 and college level teachers.
2. In the realm of education, the annual conferences of the National Council for the Social Studies and their regional, state, and local affiliates provide a nationwide network of already scheduled meetings with loyal and highly-motivated participants. Many state departments of education also sponsor annual conferences and are usually anxious to encourage workshop presentations. In Virginia, for instance, the annual statewide

conference for social studies educators has long provided an audience for encouraging the better teaching of geography.

3. In the realm of geography, the annual meetings of the Association of American Geographers and its regional divisions have begun to offer supplementary programs for teachers in the areas where they meet as well as for conference registrants.

G. UNIVERSITY INSTITUTES IN GEOGRAPHIC EDUCATION:

Largely as a result of the momentum which has built up behind the cause of geographic education in the United States, some universities have been able to attract outside funding to offer institutes of their own to teachers within their service areas. In the state of Virginia, for example, not only will there be a Satellite Summer Geography Institute sponsored by the Virginia Geographic Alliance at James Madison University, but there will also be two additional summer institutes designed to improve the teaching of geographic concepts and content in the K-12 curriculum.

1. A 4-week Environmental Geography Institute targeted at earth science, geography, and social studies teachers in grades K-12 will be held at Old Dominion University with federal funding under the Education for Economic Security Act channelled through the State Council for Higher Education in Virginia. About 30 teachers will be in attendance, each of whom will receive a stipend for participating. The content of the institute will focus on environmental topics at global, national, and local scales, including the relationships between physical and cultural geography. Strategy sessions on how to integrate content, materials, and methods into the participants' classrooms will be a part of each day's sessions.
2. A 3-week institute targeted at middle school geography teachers will be held at George Mason University with federal funding provided by the US Department of Education's Fund for the Improvement of Post-Secondary Education and channelled through the Association of American Geographers. George Mason University has been designated as one of 8

centers of excellence in the country to participate in this 3-year program designed to develop new college-level, introductory geography courses geared to the needs of future teachers. Approximately 25 participants, each of whom will receive a stipend for participating, will include school teachers and administrators who will work with university faculty in improving the middle school teacher's pre-service education in geography with an emphasis on content, state middle school geography requirements, and the fundamental themes of geography as presented in the Guidelines for Geographic Education.

While neither institute will be offered under the aegis of the Geographic Alliance movement, both will be able to take advantage of teacher consultants and materials developed as part of the Geographic Education Program and, likewise, contribute to the on-going diffusion of geographic education.

Successful Professional Development Activities:

Professional development activities such as institutes, conferences, and workshops for teachers are usually accompanied by an evaluative assessment of the degree to which they have been accomplished their goals. Common factors in successful GEP-sponsored activities have included the following:

1. A properly-targeted audience for the planned program, particulary in terms of local curriculum and teacher needs.
2. Support from educators and administrators in the planned program locale.
3. Leadership that understands the realities and difficulties of taking geographic concepts and skills into the K-12 classroom.
4. Incorporation of classroom teachers into the planning and implementation of professional development activities.
5. A balance of content and methodology in the program. The best "mix" has been one of geographical content lectures, most often by university geographers, followed by work sessions to illustrate classroom-tested teaching strategies, led by master teachers.

6. Hands-on activities that help assure use of program content and methods. Time and again, teachers have noted that materials and methods are best if they can be placed into immediate use in the classroom.
7. Institutional support. Local financial or in-kind support provides a degree of "ownership" in programs, offering a greater likelihood of lasting impact.

Conclusions:

Institutes, workshops, and conferences provide ideal settings for encouraging the diffusion of ideas, content, materials, and methods in geographic education. These professional development activities bring together academic geographers with school teachers and administrators for the express purpose of deciding how best to educate the children who will inherit the twenty-first century. Kindergarten graduates of 1988 will comprise the first graduating class of the third millennium, the high school class of "double naught." We have just twelve years to make sure that each of them and their successors pass through a curriculum which provides a useful, content-rich, and mind-expanding education in geography.

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TEACHERS LEADING TEACHERS IN AMERICA'S RENAISSANCE IN GEOGRAPHIC EDUCATION

A. David Hill

ABSTRACT

Geography is weakly represented in the American school curriculum, a structural condition that will be difficult to change. There are however signs that American geography is now on the verge of experiencing a renaissance. Recent developments include media attention about "geographic illiteracy" among students and citizens, a spate of new local and statewide geography curriculum requirements, and the refocusing onto geographic education of the resources of geographic societies. In addition, many local geographic education enhancement efforts may be found throughout the country. For example, a number of continuing education activities in the State of Colorado and the Rocky Mountain region have been coordinated in order to build a network of geographic education leaders, especially elementary and secondary teachers. Federal support from 1985-88 trained leaders in school district teams. Beginning in 1986, the Colorado Geographic Alliance, supported by the National Geographic Society, stimulated additional activities directed toward teacher leaders.

ASPECTS OF THE PROBLEM

Geography is only weakly represented in the American secondary school curriculum (Manson, 1981; Gardner, 1986). Enrollment in geography accounts for only 5% of national secondary enrollments (National Center for Education Statistics, 1984). The problem of improving the status of geography in the schools is structural and not susceptible to an easy solution. Forces determining the school curriculum are numerous and complex (Schwab, 1976). There are many actors on the stage, all of whom are part of the problem. Only a few of these actors can be mentioned here.

Inadequately prepared and too few geography teachers are both a cause and a result of this situation (Winston, 1984). State certification requirements are inadequate, e.g., Colorado requires only 5 semester hours of college geography to teach the subject at the high school level, but even this standard is often breached. There are few excellent curriculum materials for geography. Professional geographers, with the exception of a few voices crying in the wilderness, have paid little attention to geography in the schools or to the geographic education of future school teachers. Indeed, American college and university geographers have generally believed that pre-collegiate issues were beyond the pale, that others, especially colleagues in professional education, were responsible in that domain.

Faith that professional educators were taking care of geography in the schools was misplaced. It is rare in American teacher education colleges and schools to find a faculty member with solid training in geography. Those education faculty responsible for "social studies" teacher education typically have professional education degrees, not subject-matter degrees: their commitment is to the "social studies," an amalgam of civics, social science, geography, history, and "issues." (Generally, history is the only discipline that has a degree of autonomy and that is required in the social studies curriculum at the secondary level today.) But what is taught in the schools is not good social science according to most social scientists, geographers, and historians. At the same time, professional educators argue for an "integrated" curriculum that addresses the needs of "the whole child," the future citizen. They want to protect the curriculum against those who would try to give premature, specialized training in the disciplines (Wronski and Bragaw, 1986). We have a two-cultures problem that will not quickly go away.

SIGNS OF A RENAISSANCE

There are early signs of a renaissance in American geographic education, in spite of a tradition of neglect of school geography by geographers and the disinterest in geography of the professional education establishment. There is some slight public pressure building for geographic education, the public is characteristically fickle. Still, geography in America is currently receiving more attention than it has at any other time, so it would be foolish to dismiss the signs of this renaissance too quickly.

Public pressure for geography is generated largely by media attention about "geographic illiteracy" among students. Survey after survey, whether by the media, college professors, or by prestigious national commissions, tell of the geographic illiteracy of Americans (e.g., The Atlantic Council's Working Group on the Successor Generation, 1981; Barrows et al., 1981; Commission on International Education, 1984; National Commission on Excellence in Education, 1983). Press coverage of these surveys has continued unabated for the last four years (e.g., Dallas Times Herald, December 11, 1983; U.S. News & World Report, March 25, 1985.

There has been a recent spate of new local and statewide geography curriculum requirements. Just in the past four years, these have been established in California, Tennessee, Arizona, South Dakota, and Utah to name but a few. At the University of Colorado, high school geography has become an admission requirement for freshman in the College of Arts and Sciences. This pressures high schools to add geography to their programs. Generally, these new requirements were not spontaneous or random results of media attention to "geographic illiteracy." Rather, they were (and continue to be) the outcomes of well-organized campaigns led by a few professional geographers (e.g., Stutz, 1985; Salter, 1986). More recently, these campaigns (as well as numerous other promotional activities on behalf of geographic education) are the result of the refocusing onto pre-collegiate geographic education of the resources of geographic societies. For example, the four major geography societies have joined to form the Geographic Education National Implementation Project (GENIP). The *Guidelines for Geographic Education* (Natoli et al., 1984), written and sponsored jointly by the Association of American Geographers and the National Council for Geographic Education, filled the need for a national curriculum document to guide reform in geography. Especially active has been the National Geographic Society (NGS), which has thrust its very considerable resources and influence into the fray (e.g., Grosvenor, 1985). Among other efforts on behalf of geographic education, it is supporting a national network of 22 state-based geographic alliances.

FOCUS ON TEACHERS

The NGS alliance concept wisely places resources in the hands of state coordinators who are in touch with local teachers, administrators, and other interested persons and groups. We thus have a stimulus for many *local* geographic education enhancement efforts throughout the country. This local focus is in part a response to the experience of the Association of American Geographers' High School Geography Project, a large, national curriculum development effort in the 1960s. Despite its many outstanding innovations, it did not stimulate a significantly larger role for geography in the nation's schools. A major lesson of that effort was that a high quality, professionally-developed national curriculum could not *by itself* reform and promote geography in the schools. It reminded us that educational change in America takes place primarily through local initiative and cooperation. There is little national, centralized control. Rather, schools are controlled by boards of locally-elected officials. Curricula are generally controlled by these boards, and only in a few states can one find centralized, state-mandated courses of study; indeed, such state control is unconstitutional in some states. Most states do, however, set certification (licensing) criteria for teachers. School textbooks are adopted at the state level in 22 states; most adoptions occur at the district level, and in some districts autonomy lies with individual schools.

Another major lesson of the High School Geography Project is that no amount of expertise can produce "teacher-proof" curriculum materials. Teacher training and interest is a crucial link in educational reform, and any project that does not make teachers a central concern is likely to fail. Research shows that what gets taught in the schools is largely determined by teachers and administrators (presumably with the consent of the school board). These factors have pointed those professional geographers who seek to promote school geography to the need to work with teachers at the local level.

The author is one of a small but growing band of American university geographers who are leading continuing education programs for teachers at the grassroots level. Activities in the State of Colorado and the Rocky Mountain region are coordinated by the author in order to build a network of geographic education leaders, especially elementary and secondary teachers. From 1985-88, work supported by two National Science Foundation (NSF) grants created a regional network of 90 geographic educators who motivate, support, teach each other, and train colleagues in their districts to provide knowledgeable and creative teaching in modern geography. Based on the concept of empowering teams of teachers and curriculum specialists, the project--called the Rocky Mountain Geography Teachers' Leadership Network--trains school district teams and builds them into a network of regional leaders. It links these geographic educators to the Colorado Geographic Alliance and the national network of NGS alliances. Trained in summer and academic year workshops, these teams design, pilot, and evaluate educational products. After revision, these products are incorporated into the districts and disseminated within and beyond the region.

Beginning in January 1986, the Colorado Geographic Alliance, supported by the National Geographic Society, stimulated additional activities directed toward teacher leaders. The Alliance organizes workshops, meetings, and conferences in which teachers have the opportunity to develop their professional leadership abilities by conducting demonstration lessons for their peers. (The recognition of demonstrating to peers, which is usually a new professional experience for many teachers, builds esteem, which provides motivation for further development.) Another critical function of the Alliance is connecting people and keeping them informed. The Colorado Alliance mailing list now numbers over 800 people to whom we send out our newsletters and announcements. We also run a clearinghouse for teacher-developed materials. Generally, the Alliance does whatever we think will promote school geography. For example, we organized a 3-day conference in August, 1987, which attracted 160 educators from 22 states, and we published the conference proceedings in 1988. A unique feature of the conference were joint presentations by secondary teachers and university geographers. The Alliance also conducted a statewide contest in which school classes portrayed the geography of their local communities in a series of posters.

The network developed with the NSF grants is being extended with NGS support to the Colorado Alliance. In June of 1988, the Alliance added 30 teachers to the NSF 90-person network by training them in a 3-week institute. This institute was conducted according to a few key principles that informed the NSF project: (1) a staff comprised of both professional geographers and professional educators is needed; (2) build on a previous project to take advantage of cumulative development; (3) train teams to offer leadership in their school districts; (4) focus training on useful educational products; and (5) create mechanisms that sustain and expand the teacher development process.

INSTITUTION BUILDING

America's renaissance in geographic education seemed more assured than ever when the National Geographic Society announced in January 1988, that it was establishing an education foundation with an initial $20 million and challenge grant of another $20 million. Local institution building is also happening, usually in the context of the NGS alliances. For example, a new Center for Geographic Education at the University of Colorado at Boulder has teacher-leadership training as a major objective. This Center, the first of its kind in the U.S.A., provides a continuing base of support to coordinate the Colorado Geographic Alliance, thus serving the University's outreach function. In addition, it conducts geographic education research materials. The Center thus institutionalizes many geographic education developments within a major graduate department of geography. Although by no means assuring rapid curricular change, these developments are certainly indications of America's renaissance in geographic education.

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RE-VITALIZING GEOGRAPHIC EDUCATION IN THE STATE OF ALABAMA

Howard G. Johnson, William R. Strong, and David C. Weaver

Abstract:

As in many other places in the United States, geography instruction in the grade schools of Alabama became moribund in the 1960's and 1970's. During the early 1980's a group of college teachers of geography in the state pooled their frustrations over geographic literacy of their students, and established a three pronged effort to both restore geography tangibly to the school curriculum and to improve the quality of in-service geographic education of social studies and earth-science teachers. This effort has had initial successes but continuing vigilance will be needed to ensure the long term security of geographic education.

Introduction:

During the past three years (1985-88) there has been a well documented 'great awakening' on the part of the body politic in the United States, as to the diminished and diminutive position of geographic education in the public schools, and to associated problems of geographic illiteracy in the nation.(Down, 1987, Grosvenor, 1988) A number of papers at this meeting will report on specific dimensions of this reawakening and the impact on both grade school and college geographic education practices.

The purpose of this paper is to review the experience of revitalization efforts in geographic education in the state of Alabama over a somewhat longer time horizon than this most recent period of enlightenment. Alabama is of particular interest to the U.S. 'Geography Revival' movement because it developed a major statewide effort to resuscitate geography in the schools some ten years ago. This effort occurred without external support and before the recent national efforts achieved prominence. The effort has not only a longer track record by which to monitor achievement but also an extended learning curve with respect to modes of attainment of objectives.

Beginnings (SAGE & SEDAAG)
The basis of initial efforts in geographic education improvement in Alabama was established in 1969 when the late Dr. W. Koch of the University of Alabama established the Society of Alabama Geographers and Educators (SAGE). This organization operated initially through newsletter and biannual meetings, and had a small membership restricted to interested faculty of the state's two and four year colleges. While paying lip service to geographic education support at all levels, it functioned essentially as an information system and fraternal organization for college faculty.

SAGE was affiliated with the South Eastern Division of the Association of American Geographers (SEDAAG) which during the 1970's had developed great concern for the condition of geography programs in the small colleges of the region. These small college programs had experienced some enrollment decline and resulting faculty attrition. SEDAAG created a Committee on the status of Geography in the Small Colleges, on which one of the authors served. The concerns of SEDAAG with respect to the condition of Geography in the small colleges, were the primary focus of activities in SAGE. After Dr. Koch's death in 1978 leadership in SAGE devolved on a very small group of committed members including the authors who continued to meet regularly to discuss issues. There was before 1980, however, no specific agenda or deliberate action generated by SAGE for the improvement of geographic education in the schools or of any kind of outreach to involve grade school teachers in the organization.

The Crisis:
The ambivalence of attitude towards activism which characterized SAGE during its first ten years, came to a dramatic end in the summer of 1979 when Marie Hendrix, a social studies specialist in the State Department of Education, called Howard Johnson to inform him that she had just learned that the new Social Studies Course of Study Statement about to go to press

exhibited no tangible geography content. Geography, she said, was about to be excluded totally from the curriculum. After voicing her concern to Johnson, Hendrix then talked with the State Superintendent of Education, a long time colleague as well as boss, and got his permission to phone in several geography concepts and objectives for last minute inclusion in the curriculum statement.

This desperate salvage operation technically saved geography from extinction in the Alabama curriculum, but left it teetering on the brink, debilitated and largely defenseless. This condition, SAGE was to quickly realize, had not occurred overnight. A twenty year period of neglect had ultimately threatened the subject's demise. It became apparent that if SAGE was to make any contribution to saving Geography in the state curriculum for the long term,it was faced with not just one battle but a long war.

Beginning in 1980 the focus of SAGE's concern shifted inexorably away from the pre-occupation with the tenuous condition of geography in the colleges to what most members agreed was demonstrably the more critical condition of geography instruction in the grade schools.

Digging Out:

During the period 1981-84 three strategies emerged from policy discussions within SAGE, to be separately implemented by the Fall of 1984. These were 1) operation of a standardized geography knowledge test at the College freshmen level to demonstrate the degree of geographic ignorance emanating from the public schools 2) improving services to teachers by developing education oriented courses and materials and providing in-service experiences 3) finding ways to effect change through the bureaucracy of the State Department of Education.

The testing strategy was developed through agreement between the major departments of geography in the state to administer a common test to freshmen. Howard Johnson wrote to the National Council on Geographic Education for permission to copy their Introductory Level Exam. The exam was delivered to freshmen at the Universities of Alabama, North Alabama, South Alabama, Jacksonville State and Auburn in the Fall of 1983 and the Spring of 1984. Results were even lower than predicted and provided a broad statistical benchmark for the first time on the geographical performance of Alabama students.

In October of 1984, Dr. Evelyn Pratt, a member of the State Board of Education was invited to the fall meeting of SAGE to review the results of the previous years testing. At that time she was questioned about effective procedures for influencing the State Department of Education. Dr. Pratt recommended specific lobbying strategies which would be appropriate and offered to arrange a formal presentation by SAGE representatives before the State Board. By coincidence the SEDAAG annual meeting was scheduled for November 1984 in Birmingham. It was agreed that Dr. Pratt would be invited to speak at that meeting, and that a next day representation would be made before the State Board in Montgomery. In spite of some last minute opposition on the State Board to allowing SAGE members to speak, the presentation was made, and this created major awareness of the sorry condition of geographic education in the State. Consequent to the meeting SAGE received advice from employees of the Department of Education on acceptable modes of influencing policy. These contacts resulted in the implementation of a major letter writing campaign to the Superintendent and the Board, of the appointment of W. Strong to serve on the committee that would revise ASSCS for 1986 and the placing of Howard Johnson, and Mary Hansen, a high school geography teacher, on the task force which would review the ASCS document. A number of geographers were allowed to make statements at regional public hearings on the new curriculum guidelines. Shortly thereafter, Vicki Rivizzigno of the Department of Geography at the University of South Alabama was appointed to the State textbook selection committee. This was a direct result of the message being propounded by SAGE.

Laying the New Foundation

As a result of all this action on varied fronts the 1986 revision of the State ASSCS guidelines contained substantial increases in geographical content.(Teague, 1986) The Social Studies Course of Study was written during 1985-86 and was accepted by the Board of Education in the summer of 1986. It contained units on geography in the K-6 curriculum, a one year course entitled Regional Studies of the Eastern Hemisphere in the 7th Grade, a one semester World Geography course in the 9th grade and geography components in all history courses. Much of the content incorporated in revised curriculum was abstracted directly from "Guidelines for Geographic Education" which had just been published under national sponsorship.(Guidelines, 1986) This little booklet made a significant impression on the curriculum committee.

In the Spring of 1986 word of the progress being made in Alabama was reaching the national level and at the spring meeting of the Association of American Geographers in Minneapolis representatives of the National Geographic Society announced their intention of making Alabama the eighth member of their newly established Alliance organization. The U. S. national Alliance organization which is being separately reported on at this meeting had been started in 1986 with seven affiliates. Anticipating rapid expansion, NGS proposed to bring Alabama into the fold in January of 1987.

During the summer of 1986 SAGE members continued to work with the State Department of Education and to plan a major Fall meeting in the center of the State to brief teachers and education administrators on both the new curriculum and the proposed association with the National Geographic Society. In October the meeting was held near Birmingham with the largest attendance ever for a SAGE convention. At the meeting were a number of high ranking Department of Education officials who both distributed copies of the new curriculum guidelines, and who praised SAGE members for their judicious efforts in improving the social studies curriculum. Each of the education officials declared that they would support the activities of geographers in the state in the years to come. They were also appreciative of the fact that SAGE and the universities were developing workshops, in-service seminars, and graduate courses in geography for teachers. A number of teachers and other educational officials attending expressed interest in developing a variety of geography in-service and 'awareness' programs in their own school districts.

In January 1987 Alabama became officially a National Geographic sponsored Alliance state with the three authors as Alliance co-ordinators. Operating funds were allocated by NGS and the Alliance began to organize a number of in-service and awareness activities including an Alliance newsletter. In-service activities focussed primarily on one to three day workshops and institutes, while awareness activities included media coverage, an awareness day for the City of Birmingham Schools in the Spring, and a state wide Awareness Day in the Fall, coinciding with National Geography Awareness Day. In July 1987 five outstanding secondary school teachers from the state were selected in competition to attend the National Geographic Society's Summer Institute for teacher's in Washington D.C.

During the fall of 1987 and the spring of 1988, returning summer institute trainees were designated teacher consultants, and were brought into Alliance activities in four ways. They were used as resource persons for in-service institutes and workshops, they were placed on programs at national and state professional geography meetings, they were each appointed to the Alliance Steering Committee, and they were used as lobbyists with respect to the State Board of Education, the Legislature and the Governor's office. As a result of Alliance lobbying efforts the state offered to match a $50,000.00 grant challenge from NGS, which has resulted in a budget of over $100,000.00 accruing to the Alabama Alliance for the year 1988.

Conclusion:

The ten year history of involvement between college teachers of geography, State goverment and local public school districts, to enhance geographic education in Alabama shows that major impacts can be made on educational policy if a number of elements can be organized and integrated. In Alabama the elements which contributed to success were:

1.) Strong, voluntary, financially unrewarded commitment from college faculty who devoted many hours of work to the cause.

2.) Adherence to established bureaucratic procedures for producing change.

3.) Support of regional and national organizations which provided both money and materials at critical points in the effort.

4.) Effective programming which persuaded school districts that geography and geographers had something to offer.

While the future of geography in grade school education in Alabama is by no means assured, its prospects look undisputably better than they did ten years ago, and the cadre of support already in place will certainly not dissipate overnight. The Alabama Geographic Alliance intends to maintain constant vigilance, and increase its outreach activities, to militate against a repeat of the nadir of 1979.

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(Sub-Theme: Continuing Education of Geography Teachers)

Title: A Distance Learning Strategy for Geography Teachers

Author: W. Ashley Kent

Abstract: This paper outlines a case study of Distance Learning in the form of a package developed for geography teachers. It reviews the new environment in the UK for in-service and information technology showing how the Learning Geography with Computers Pack has arrived at an appropriate time. The Pack's history, structure, intended market and uses are explored and its strengths and weaknesses are evaluated as a distance learning strategy.

Introduction: In England at present we are faced with an educational system undergoing dramatic, for some disturbing and demoralising, externally imposed and radical changes. Toffler, (1970) has warned us of the human consequences of rapid political, economic and social change and it seems to this author that educationalists in Britain are suffering a form of 'anomie' in the face of seemingly endless and centrally controlled changes. We are faced with an increasingly obsessive vocationally oriented educational philosophy underpinned by an overt belief in market forces. The national curriculum, just one part of the (so-called) Great Education Reform Bill (GERBIL), and a new examining system at 16 (the General Certificate of Secondary Education) are being rushed through in indecent haste.

One other radical element of educational policy has been the complete restructuring of the system whereby teachers receive in-service education and training (INSET). The Local Education Authority Training Grants Scheme was created under the provisions of the Education Act 1986 and full details were first revealed in the Department of Education and Science (DES) Circular No. 6/86 (29 August 1986) 'The scheme is intended to help local authorities to organise in-service training more systematically so as to meet both national and local training needs and priorities'. (DES, 1986)

The thrust of this initiative is further central control in this case of INSET through Grant Related In-Service Education and Training (GRIST). Local Education Authorities (LEAs) have to submit for approval annual INSET proposals to the DES one year ahead of time. Nineteen national priority areas (fig. 1) receive 35% of grant-aided expenditure whereas local priority areas (identified by the LEAs) receive 65%. Clearly approval is given to those proposals which display 'relevance', 'coherence', 'value for money' and is 'targetted INSET'. (DES, 1986). The principle underlying this development is to put 'the LEAs into the driving seat' according to Pauline Perry (then Chief HMI) in a lecture delivered at the Institute of Education in June 1986. The intention is to give more autonomy to LEAs, headteachers and classroom teachers through new INSET arrangements

This new GRIST environment means that more INSET can be school or locally based and there should be money to pay for the human and teaching resources necessary.

Fig. 1 National Priority Areas

School Teachers

1. Training in organisation and management in the context of the responsibilities of head teachers and other senior teachers in schools.

2. Training in the teaching of mathematics.

3. Training to meet the special educational needs of pupils with learning difficulties in schools.

4. Training related to industry, the economy and the world of work.

5. Training in the teaching of science.

6. Training in the teaching of craft, design and technology (CDT).

7. Training in teaching and the planning of the curriculum in a multi-ethnic society.

8. Training in the teaching of microelectronics and in the uses of microelectronics across the curriculum.

9. Training in the teaching of religious education.

Further Education Teachers

10. Training related to industry, the economy and the world of work.

11. Training to develop competence in the teaching of technical, commercial or professional subjects in the light of recent developments in industry, commerce or the professions.

12. Training in organisation and management in the context of the responsibilities of teachers in further education.

13. Training to meet the special educational needs of further education students with learning difficulties.

14. The training of teachers engaged mainly or entirely in the provision of advanced further education (AFE) in polytechnics and certain other institutions.

15. Training in the teaching of microelectronics and in the uses of microelectronics across the curriculum.

School and Further Education Teachers

16. Training for the General Certificate of Secondary Education (GCSE).

School and Further Education Teachers and Youth and Community

17. Training to help combat misuse of drugs.

18. Training for youth and community workers.

19. The training of educational psychologists.

National Priority Area eight in 'Training in the teaching of microelectronics and in the uses of microelectronics across the curriculum'. This means that substantial GRIST money is available to support initiatives to do with Information Technology (IT) in geography. At the same time it has become government policy to encourage the use of computers across the curriculum. So, for instance, the Microelectronics Education Support Unit[1] (MESU) has been established as a national agency to support advisers and teacher trainers. It is into these new INSET and IT environments that Learning Geography with Computers (1988) has been launched.

The need for such a rich in-service resource is clear since in spite of considerable geography software development and publications geared to supporting teachers, the integration of IT into geography courses has been limited. Geography teachers though positive in attitude to this innovation are uncertain of its advantages and need clearer guidance/answers to the following much asked questions:

- Is this all as difficult as it appears?
- Computers frighten me, how do I overcome this fear?
- Who do I ask for advice?
- What group of children should I start with?
- What program should I use first?
- How do I find out about software?
- What teaching strategy should I use first?
- What preparation is required?
- What programs can I move on to?
- Should the school and department have a policy about computers?
- Where else do I go for information about computing?
- How do I cope with only one microcomputer and a class of thirty?
- How do I use the computer laboratory/network since it is the only way I can get access to computers?

The Learning Geography with Computers pack is intended to offer practical guidance to teachers asking such questions. It resulted from the deliberations of the Computer Based Learning Panel for Geography chaired by Deryn Watson and financed by the Microelectronics in Education Programme (MEP) the forerunner of MESU which subsequently took over the costs of publication. In particular Michael Milton of Charles Darwin School in Bromley, an LEA on the south eastern edge of London, was appointed Research Officer to the Project for the academic year 1986/7 and was based at the University of London Institute of Education. Michael was advised by a Steering Committee acting as an active editorial board and included representatives from HMI, advisers, teacher educators, the Geographical Association (GA) and software producers. In addition the MESU funded two conferences for humanities advisers/inspectors both held in Bristol which offered constructive guidance to Michael Milton and generated two GA publications (Fox and Tapsfield, 1986 and Kent and Riley, 1988).

The Pack's eventual structure (fig. 2) owes a great deal to the formative evaluation of the steering committee and the conferences for advisers but, of course, mainly to the compilation work of Michael Milton and the editing of Deryn Watson. It consists of eight modules five of which include software. These are 'Starting Out' the introductory module; 'Development Studies'; 'Economic Understanding'; 'Physical Processes'; and 'Population and Settlement', four core themes in geography courses. These five modules have a common structure. They start with an initial activity focussing on one piece of software provided to encourage teachers to examine and explore the program and consider some of the questions and issues it raises about the geography curriculum. Users are guided through the use of software via simple to follow flow-charts. Classroom case studies of programs included in each module illustrate different ways of using them with a range of children. In each of these modules one or two articles are provided as resources for further enquiries about microcomputers and the geography curriculum in the context of the particular module.

So for instance in the 'Starting Out' module FRONT PAGE EXTRA (a newspaper simulator) is included with various case studies of its use. CHOOSING SITES is also included again with two case studies, one for airport location and another for office location. These case studies were written by geography teachers in different schools. CLIMATE GRAPHS was another program included and as with the others this is accompanied by a case study, flow diagram and suggested follow-up questions and activities. Data handling is explored in this introductory module whereby a population file is handled via GRASS. The 'Starting Out' module also has a section of questions much asked by geography teachers about micros with the appropriate answers.

The other three modules in the Pack are:- 'Using ...' which offers suggestions as to how it might be used for INSET in a variety of contexts; 'Reading About...' which consists of 16 short articles of general relevance to IT and geography for instance, collaborative learning, social and political literacy and geography, pre-vocational education and micros; and 'Materials for ...' which offers advice on sources of software, helpful organisations, journals and literature on the topic. Themes which straddle the modules include data handling, spreadsheets and fieldwork.

The Pack has been written directly for geography teachers either using it as a self study package or ideally with other geography teachers in their own school, another school, a teachers centre or a local institute of higher education. Naturally it will be a ready made resource for initial teacher trainers, advisers, advisory teachers and other INSET providers. MESU has thought through the follow up and dissemination stages of the Pack's use. A network of university department of education tutors in geography will provide and coordinate INSET

Fig. 2 Learning Geography with Computers

What is included?

The eight modules contain:

- a guide to using the pack
- case studies illustrating the use of software in classrooms
- examples of classroom and INSET activities
- advice on using computers in the geography curriculum
- articles on the role of information technology
- checklists to help you organise and evaluate the use of computers
- classroom materials, including commercial software

What are the modules?

- Starting Out ... Learning Geography with Computers
- Using ... Learning Geography with Computers
- Development Studies
- Economic Understanding
- Physical Processes
- Population and Settlement
- Reading about ... Learning Geography with Computers
- Materials for ... Learning Geography with Computers

Data handling, oracy, fieldwork and other cross curricular themes are covered across the modules.

What software?

. CHOOSING SITES	Longmans
. CLIMATE GRAPH	Andrea Tapsfield
. FRONT PAGE EXTRA	Micros & Primary Education
. GRASS	Newman Software
. HUMAN POPULATION GROWTH	Longmans
. SAND HARVEST (BBC only)	CWDE (Longmans)
. SLOPES (BBC only)	Granada
. DRAINAGE BASIN SIMULATION (RML only)	ILECC
. STARS	Advisory Unit, Hatfield

Also data files on weather, population, development, occupations, census.

What computers will be needed?

Learning Geography with Computers will be available in two versions:
BBC for BBC B and Master computers
Research Machines for 480Z and Nimbus computers
(NB some software may not be available for all machines)

Who has the pack been written for?

- teachers
- teacher educators
- INSET providers
- advisers and advisory teachers

For use with school based GRIST, 'Baker' days, PGCE courses, INSET courses, curriculum diplomas and certificates or as a self-study pack.

provision based on the Pack for their respective regions. At the same time two national conferences have been organised in the summer of 1988 to introduce humanities/geography advisers/inspectors and teacher educators to the humanities work of MESU as well as to introduce the Pack. The Pack is to be offically launched at the Geographical Association Conference in London in April 1988.

Discussion: Since the successful publication of three GYSL Packs and teachers guide in the UK there has been little in geography education which has been such a varied and rich resource for potentially changing classroom pedagogy. The *Learning Geography with Computers* Pack again offers such rich potential. It will very soon by in many schools in the UK not least because of its marvellously low (subsidised) price! Its strength is the endless ways in which it can be used by teachers. On the other hand that strength could be a weakness since at first sight it could be seen to be large and indigestible Because of the new INSET environment in the UK where local resources and power now dominate the provision of staff developmen it has arrived at a most aposite moment. What it does need is supporting classroom videos of the use of the new technology in geography classrooms such as those produced by this author[2] and the MESU[3].

Conclusions: Distance Learning is beginning to take off in the UK with radical initiatives such as the new Open College and the now well established Open University. Schools broadcasting, especially television, is increasing in popularity through the medium of videotape and exciting possibilities for satellite drive education are being discussed. Packages such as *Learning Geography with Computers* offers similar advantages, in particular the provision by outside 'experts' of a resource which can be adapted to local circumstances and is one way of introducing innovation. After all the business world uses computer based learning techniques, in particular interactive video, as a relatively cost effective medium of training.

This distance learning trend is reinforced by the thrust towards school based, or at any rate, locally based INSET funded by GRIST money. Given the present day pressures on British teachers one wonders if distance learning packs such as *Learning Geography with Computers* might not be an answer to the problem of keeping busy teachers up to date with the latest curriculum innovations? The fear of course is that however imaginatively produced such a bought-in curriculum package could either be misused or sit gathering dust on departmental shelves! What is clearly needed at local level is a network of facilitators given the time and resources to fulfil the potential of such innovatory INSET resources.

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Toffler, A. (1970), Future Shock, Pan.

Notes

1 MESU was established in 1986 to 'work with teacher educators, LEA advisers, inspectors and others to spread good classroom practice using new technology in all curriculum areas.

2 Kent, W.A. (1988). The New Technology in Action in Geography Classrooms. A Video Project. A compilation of eight UK geography classrooms launched at Brisbane, 1988.

3 MESU is engaged in compiling a range of geography classroom videotapes to support INSET.

IN-SERVICE GEOGRAPHICAL EDUCATION: THE UGANDAN EXPERIENCE

Erisa, N.G. Kyagulanyi

Abstract:

This paper which is based on the Ugandan experience advocates for in-service geographical education for the following reasons. Firstly, pre-service education cannot meet all the needs of teachers. Secondly, whereas school experience enriches teachers it also opens up new challenges. Thirdly, changes in the Geography curriculum requires appropriate orientations. Fourthly, the efficient use of audio-visual aids necessitates more frequent enrichments. Finally, many teachers crave for further training and sharing of experiences. These factors are all inter-related but the analysis has been made for purposes of emphasis.

Introduction:

'Knowing that pupils learn what they like, we must make them enjoy what they learn.' It should be noted that successful teaching is contingent upon continuous successful learning. After a review of the problems of pre-service training, the focus of the paper will be on non-award learning experiences. The latter include seminars, workshops, conferences, the traditional refresher courses and the informal sharing of experiences for example, through the print sources.

The literature review which follows attempts to put this paper into the context of contemporary geographical work. From a philosophical point of view, geography at the elementary and secondary school level is relatively stable. Therefore, it is easy to handle for example, through the regional framework (Holt-Jensen, 1980). However, at the universities where teachers are trained, the situation is turbulent and confusing due to the divergent and increasing number of ideologies particularly in the field of human geography (Ibid., Johnston 1983, Gregory 1978, Ley 1978).

Schools offer unique opportunities for teachers to gain practical experience. The dynamism of the school atmosphere was elaborated on elsewhere (Haycocks in Gopsil 1973, Graves 1980). It is this dynamism which leaves a teacher wanting and in this respect, the commonest training needs of teachers include the lack of teaching competences, motivation and inappropriate instructional aids.

The launching of a new curriculum introduces significant innovations as the 16 - 19 year olds geography project in the 1980s in the United Kingdom illustrates (IGU 1984). This led to the preparation of new courses, resource materials and examination syllabuses. However, the teachers who participated in the project were given some special support.

The efficient use of education resources obviously necessitates more in-service training. This is particularly crucial when the resources are unfamiliar. For example, the Computer Assisted Learning is an innovation that calls for teachers to acquire basic skills in computer literacy (IGU 1984). The subsequent programmed learning is another innovation which has implications for further curriculum development. Since the developing countries in particular lack a variety of educational resources, the gradual introduction of these resources will generate pressures for the appropriate form of in-service training. But there is also a need to improve the effectiveness of the otherwise familiar audio-visual aids.

The meeting of geographers at various levels offers unique opportunities of sharing experiences but this strategy may be expensive where long journeys are involved. The print sources are the cheapest avenues through which teachers can easily share experiences. It is interesting to note that the Geographical Association of the United Kingdom has a journal, which handles the geography content called Geography. It also publishes a second journal called Teaching Geography which handles the methods component. The latter handles practical teaching problems. Further, both journals give useful information pertaining to source materials for geography teaching aids and in-service courses. It is also interesting to note that both journals encourage their readers to contribute articles.

In the main text, examples of the experiences and potentials of in-service geographical education will be presented. The main ideas will be further illustrated by presenting an empirical survey carried out recently by the author. Finally, the basic outcomes of this paper will be discussed and in the conclusion, proposals for the promotion of in-service education will be put forward.

Main text:

Educators are faced with a difficult question of how and by whom the teachers should be trained. The commonest model of teacher education worldwide is to offer academic content courses first (B.A. or B.Sc.). Thereafter the graduates who wish to take education may do a

Post Graduate Diploma in Education (hereinafter, PGDE). This model has the advantage of helping students to acquire ample academic content. On the other hand, the main criticism of this model is that it takes a long time to train a teacher and some of the narrow specialisations may not be in the best interests of the teaching profession (Bamanyaki 1979, Agard 1975). This model is well represented at Makerere University.

The second pattern is illustrated by our Institute. The academic and methods component courses of geography are all handled by the same discipline. In this respect, both components are catered for by long experienced professional educators. However, there is a fear that students programmes are too compact. Further, the B.Ed. Programmes have been widely challenged that they are professionally desirable but are academically inadequate (Bamanyaki, 1975).

The monitoring of teachers' experiences in schools is crucial in identifying teachers' needs. For example, the inspector of schools (Geography) analysed students performances and some of his data is presented below:

Table 1: Performance at 'O' level in two selected schools

I Sch.	II No. Cand.	III Dist.		IV Credits				V Passes		VI Fail
		D1	D2	c3	c4	c5	c6	P7	P8	F9
X	112	0	0	1	0	0	4	8	17	80
Z	115	10	13	39	11	14	11	8	6	2

Columns: I - School
II - Number of Candidates
III - Distinctions

Table 1 shows the performance at 'O' level in two selected schools in the 1970s. With reference to the above data, the inspector observed that the three elements in the learning process namely the teacher, the student and the subject matter were linked in a triangular pattern by a Telephone line. It therefore follows that in school X either the Telephone line was broken, or the teacher dialed the wrong number. This explains why in that school 81% of the pupils either failed or got very weak passes. He put the blame squarely on the teachers and teacher-training institutions (Musisi after Kyagulanyi, 1980). However, it is gratifying to note that in school Z the performance was very good. Thus 21% of the pupils got distinctions, 65% credits and only 14% got passes or failures. The teachers in school X could improve their performance by reflecting on their work and doing in-service courses.

With the introduction of the new 'A' level (upper secondary) syllabus in 1980, many changes took place. The structure of papers was revised drastically. These changes led to the launching of orientation programmes for the 'A' level teachers. Many teachers had to take fieldwork seriously for the first time in their teaching experiences. Consequently, the National Curriculum Development Centre (herein after NCDC) published a detailed guideline to meet teachers' needs in this area (NCDC 1980). Uganda has limited educational resources but even with these, there is room for improvement. For example in photographic interpretation more emphasis should be put on developing broad themes rather than identifying individual phenomenon. With reference to Fig. 1 about Uganda photostudy I, and Fig 2 Uganda, photostudy II the key themes would be as follows:

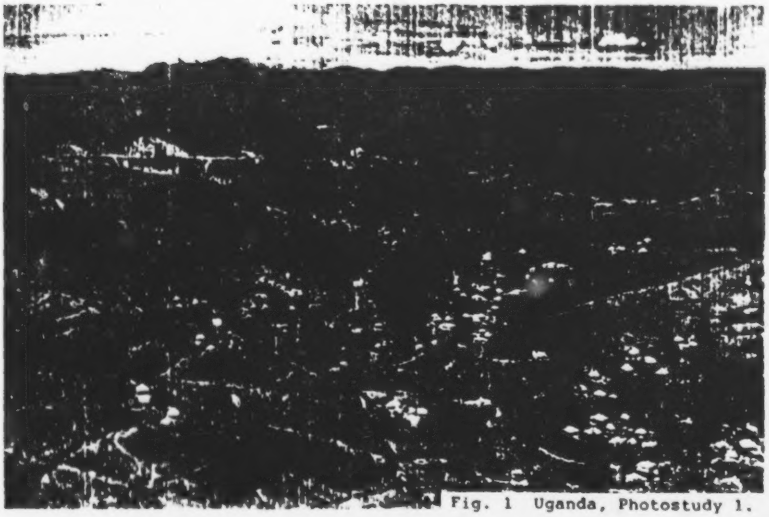

Fig. 1 Uganda, Photostudy 1.

Fig. 2 Uganda, Photostudy 2.

For the former, rural settlement in a highland and the latter, urban development. It is against these key themes that pupils can build the detals. For example, the building in the right hand foreground is our parliament and it shows therefore that Fig. 2 is a photograph of Kampala City.

The print sources contribute significantly to informal learning. In the 1970s, the Uganda Geographical Association used to produce a journal called The East African Geographical Review, and a Newsletter - the latter was specifically for teachers. Similarly, the Ministry of Education used to produce Geography and Education and Kyambogo a Geographical Magazine. However, due to problems beyond our control, the publications have not been revived. The sharing of experiences has been limited to refresher courses.

An empirical survey focusing on teachers' competency was carried out to find out teachers' evaluation of their formal training, practical experience and their in-service education needs. Fig. 5 shows the survey of teachers' evaluation. Teachers were asked to give appropriate points ranging from 0 (for poor) to 5 (for excellent). For purposes of studying personal profiles, ten questionnaires were picked at random and these were entered in the columns labelled A to J. The first row is for the geography content whereas the last one is for education in general. The rest of the rows are about specific aspects of geographical education. Percentages were worked out to show the overall evaluation of the items in the rows and the personal profiles. The average personal profile was 42% which shows that the teachers only felt

Fig. 3 : Survey of teachers evaluations

Items	Individual teachers' evaluations										%
geog. content	0	4	3	4	5	1	4	3	2	4	60
gen. methods	3	4	3	4	1	3	4	3	3	4	64
Mapwork	4	4	1	5	3	4	4	5	2	3	70
photo interp.	4	3	1	4	0	4	4	1	1	3	50
quantitative	3	3	2	5	1	3	4	1	1	2	50
fieldwork	1	4	1	5	3	2	3	1	1	3	48
projects	3	3	1	5	3	3	3	0	2	3	52
slides	0	2	2	2	0	1	0	0	0	2	18
films	0	1	2	2	0	1	0	0	0	1	14
Video	0	0	1	2	0	1	0	0	0	1	10
computer	0	0	1	0	0	0	0	0	0	1	04
modelling	1	1	3	3	0	1	4	1	1	3	36
concept. models	1	2	2	4	3	0	4	0	0	1	34
drama	3	0	1	4	0	1	3	3	0	1	32
testing	3	3	2	5	5	3	4	0	1	4	60
curric. dev.	3	3	1	2	0	3	4	0	0	3	38
supervis. instr.	1	3	2	4	1	0	3	1	1	3	38
geog. clubs & depts	3	4	2	4	3	3	4	1	1	4	58
res. geog. edn	1	2	1	2	3	3	3	1	0	3	38
educat. gen.	3	4	4	4	5	0	4	1	4	4	66
pers. profiles %	37	50	36	70	36	37	62	22	20	54	

Key to abbreviations

geog - geography
gen - general
interp. - interpretation
curric. dev. - curriculum development
superv. instr. - supervision of instructions (it relates to student teachers)
res. geog. edn. - researching geographical education
educ. gen. - education in general
pers. - personal

that they were fair. Only two of the teachers D and G felt that they were good. The items which scored 2 points and below reflect thr areas where the teachers' competency is lacking and these include the use of computers, videos filmstrips and slides in Geography teaching.

The overall analysis of all questionnaires indicated that 94% of all the respondents were in favour of doing in-service refresher courses. Then 59% of all respondents indicated that refresher courses were essential whereas 35% only saw it as being important. Teachers also indicated how often they would like to have refresher courses as follows: once a year (47%), once in two years (35%) and once a term (20%). The majority of teachers indicated that they wanted more skills in fieldwork (44%) whereas others felt that they lacked content (12%). Other specific areas of training needs included audio-visual aids, curriculum development, physical geography, supervision of student-teachers and photographic interpretation.

Discussion:

The challenges of training teachers have been analysed. There is a dilemma of striking a balance between offering deep academic content and developing the educational components. Whereas the problem is difficult to solve, one wonders whether a bachelor's course is an end in itself. The author strongly feels the first professional courses are only for initiation. It is through in-service education that one can develop his professional skills.

This paper favours child-centred approaches. When a teacher fails to motivate a child to enjoy his lesson as the case was with school X, then the blame goes to the teacher. However, the resource persons in the field may increase the teachers' efficiency through in-service courses.

The examples of the launching of new school curricular have shown that such projects may succeed among other things by conducting orientation courses for the teachers concerned. Similarly, the efficient and effective use of audio-visual aids requires more reflection and enrichments. On the other hand, the sharing of experiences needs the re-activation of forces which inspire informal learning for example, the print sources.

Conclusion:

In-service education helps a person to develop his professional skills as need arises. The teachers have a challenge of catering for pupils with varied interests and abilities. Therefore, the teaching could be further enriched by helping teachers to share their experiences through demonstrations, discussions, and print sources.

Proposals pertaining to the foregoing points are presented below:

1. There is need to do research and evaluate teacher training programmes.
2. The teacher-training institutions should have extension programmes to monitor the progress of their former students.
3. The monitoring process would help to identify teachers' training needs. The joint effort of training institutions and the ministries of education would help to launch refresher courses which meets students needs.

4. There is a need to justify geography's unique contributions to the school curriculum in particular and national development in general. There are fears that school curricular are congested with far too many subjects. The social studies and environmental science approach are seen as moves which may engulf the discipline.
5. There is a need to establish resource centres at national or regional level to cater for audio-visual aids in particular and other educational resources in general, for example the print sources. Teachers should be encouraged to publish work related to their environment.
6. The sharing of experiences at international level is good. However, the establishment of smaller IGU regions such as East Africa with the representation of the various commissions may help in mobilising more geographers particularly the teachers.
7. There is need to organise refresher courses at local level. Where problems are of a regional or international level, then the appropriate meetings of resource persons should be planned accordingly.
8. Learning centres should be established to meet teachers educational needs in their local areas (such as that mentioned by Gwilliam, Geographical Association, 1987).

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READY-TO-USE GEOGRAPHY

David A. Lanegran

Abstract

A combination of secondary teachers and college professors have worked together in Minnesota to develop a plan which will enable social studies teachers in geography classrooms to both upgrade their understanding of geography and develop new teaching materials. The key components of this plan have been summer institutes and the concept of a cooperatively produced unit bank. The unit bank contains a variety of materials produced by teachers which are appropriate to a wide variety of geography classrooms. Once this process was begun, we became one of the state alliances in the National Geographic Society's network of Alliances for Geographic Education. The organization has now developed a comprehensive plan to continue to upgrade the geographic understandings of social studies teachers and to increase the size and number of users of our unit bank.

Introduction

After several years of listening to teachers complain about the lack of good teaching materials to complement the textbooks currently in use, the Geography Department of Macalester and several secondary teachers determined to find a way to make available a variety of packages which could be used in geography classrooms around the state. We believed that many teachers had developed excellent materials for their own use and that if we could make those materials available to other teachers, we could greatly enhance the quality of instruction. Furthermore, we believed that new materials which conform to the fundamental concepts of geography could be created to make it easier for all social studies teachers to deal with geography. This is an issue in Minnesota because most people teaching geography do not have adequate training in the discipline.

Our strategy was based on experiences we had in a variety of summer institutes. We felt that we needed to create an experience which would unite a group of teachers into a cadre to provide new materials for teacher use and to provide the political push from within the educational establishment necessary to make geography an important part of the curriculum. We determined to find the funds necessary to mount a series of summer institutes for social studies teachers.

Background

A small group of Minnesota geography teachers met at Macalester during the spring of 1983 to discuss ways to improve their own classroom teaching. In the course of their research on what sorts of innovations were occurring in the state and across the country, they quickly learned of the efforts of the Association of American Geographers (AAG) and the National Council for Geographic Education (NCGE) to create a set of guidelines for geographic education in elementary and secondary schools. In addition, they were made aware of an intensified interest by the State Department of Education in the improvement of geographic education.

During the summer of 1983, I was asked to write the first draft of the AAG-NCGE Guidelines for Geographic Education. This document was completed in September, 1983, and subsequently circulated for discussion and revision. The purpose of the Guidelines is to enable decision-makers in school districts across the country to evaluate the role geography should play in the K-12 curriculums. In addition, it provides goals and objectives for all grade levels and presents model course outlines for high school classes. The GEN Geographic Education National Implementation Plan) Steering Committee was created by the AAG, the NCGE, the American Geographical Society and the National Geographic Society. This steering committee is now responsible for the continued publication and revision of the Guidelines. We expect to produce additional guidelines in the coming years.

Needs Assessment

Conversations with the State Social Science Coordinator resulted in a survey in early September, 1983, of all geography teachers in Minnesota to ascertain what they thought was lacking in geographic education and what sorts of activities or materials they needed to become more effective teachers. After the surveys were returned to the state office, they were reviewed and a follow-up workshop was organised. Twenty-five teachers from across the state, representing the entire range of school districts and teaching situations (Indian reservations, a small lumber town, farm trade centres, inner-city and affluent suburbs) and levels of individual training and experience, were invited to that October meeting. This workshop focused on three issues: 1) the draft version for the AAG-NCGE Guidelines, 2) the desired learner outcomes for a geography course, and 3) needs of teachers and geographic education. In addition to the formal objectives, many unexpected benefits resulted from the meeting.

Regional Workshops

The State Department of Education responded to the needs assessment conducted at the September workshop by establishing a series of one-day workshops around the state. These workshops were conducted by the Macalester Geography Department and dealt with the fundamental concepts of geography, the role of the computer in geography, cartography and graphic communication, and how to introduce basic map-making into the geography classroom. We also discussed available textbooks and strategies for updating and revising curriculum materials.

Local arrangements for these workshops were made with the cooperation of the system of Educational Cooperative Service Units (ECSUs) or Teacher Centres. The ECSUs receive administrative support from the state, but no funds for programming are granted by the state. We held workshops in the metropolitan core of the state, in the northern forest region and in the southern agricultural zone. Although the workshops were successful, the participants' evaluations all indicated a need for a longer period of time to create new materials using the ideas of the workshop staff, and to totally review the structure of the world regional course. All the teachers pointed out the difficulty of teaching world geography to students who are just beginning to discover each other and who do not think about places beyond the immediate locale.

In addition, the outstate teachers pointed out that many small school districts in sparsely settled areas experiencing staff reduction have assigned teachers to geography classrooms even though the teachers are not prepared in the subject matter. We learned that this was a statewide problem and that in-depth help must be provided to those teachers if they are to do a credible job. We assume this is a national concern and have been told that about one-third of all school districts in the United States must cope with the problem.

These workshop evaluations clearly indicated a need for substantive changes in the content of junior high courses and for more creative ways in which to involve students in learning about the world. They also indicated a need for greater communication between the staffs of elementary and secondary schools in the same district.

Because the re-education of Minnesota's geography teachers requires more time and personnel than can be provided by the Geography Department of Macalester College, we formed a process which will produce a statewide network of geographers teaching at all levels. This network exists to provide in a cooperative way new teaching materials and learning experiences for in-service teachers in the state. In addition, we are striving to improve the image of geography as a discipline and course of study for secondary students.

National Science Foundation Institutes

The first major step in our plan was to establish a financial base for a series of summer institutes. The funds were forthcoming from the National Science Foundation (NSF). With NSF support we offered graduate-level education in geographic education during the summers of 1985, 1986 and 1987. About 100 teachers graduated from this programme. Because each participant was required to create teaching materials, we have developed a teaching unit bank at Macalester which contains a wide variety of teaching materials. In the second and third institutes, we gave preference to teams of teachers in our admission process. We were especially interested in teams which included both elementary and secondary teachers. While several teams did apply, we found a surprising reluctance from school district administrators to help put together teams, and so most teams were formed by people who already knew one another from other contexts.

Teachers participating in the institutes attended three course components, two lecture classes and a curriculum development laboratory. In addition to preparing teaching units, each teacher was required to share materials with other members of the teaching corps in their home districts through in-service activities or informal sharing sessions. The content of the lecture courses was presented by Macalester staff augmented by members of the Geography Department at the University of Minnesota. This arrangement made it possible for us to tap into the top-rated geography department in the United States. But the most important segment of the faculty was a group of master teachers who taught the curriculum laboratory segment of the institute. These six teachers really made our programme credible because they understood the needs of the classroom teacher and encouraged us to adapt our programme to suit real needs and not to focus on conventional stereotypes of teachers and classroom situations.

The success of the institutes forced us to cope with the dissemination process. We found that while the demand for materials was great, teachers were not able to come to Macalester to work in our collection. Secondly, we found that despite all our efforts to get word out about our programme, many teachers were not informed. We combatted this by publishing a newsletter which contained general news about geographic education and lists of the available units. We also became very active in the Minnesota Council for Social Studies (MCSS). At the annual conventions of the MCSS, geography teachers from our network presented several sessions on the units they had created. In addition to making the presentation, they brought with them handouts of the essential material needed for other teachers to duplicate their lessons. The response to these sessions was tremendous. Now we have a way to teachers to learn about our programme, but we still have yet to resolve the problems of finding time for teachers to come and use our lesson bank.

NGS Alliance for Geographic Education

In 1986 we learned of the plans of the National Geographic Society (NGS) to enhance geographic education. We applied, and in 1987 became one of the State Alliances in the NGS network.

The Alliance status has enable us to greatly expand the scope of our newsletter, and we now send it to every teacher of secondary geography classes in the state. Secondly, we are now able to develop smaller programmes which focus on specific issues faced by teachers. For example, we developed a field experience in northern Minnesota so teachers in the southern part of the state could see first-hand some of the environmental and landuse issues confronting people in that part of the state. However, we still have not developed a process which actually enables teachers to exchange materials they have already developed. The Alliance activities are focused on building up a cadre of committed teachers who are willing to speak out on behalf of geography. We know that there are many teachers who are using materials they have developed but who are reluctant to show the world what they use to teach. We hope that the cadre of teachers in the Alliance will be visible enough so as to encourage other teachers to come forward and share the units they are now using.

Because we have been unable to stimulate a widespread pooling of exciting teaching units, we have continued to go forward with a summer institute experience which requires participants to create new teaching units. We also require these teachers to share their newly crafted materials. Thus, we are assured of a flow of new materials while we await the breakthrough to the existing materials already in use in Minnesota classrooms.

Fund for the Improvement of Post-Secondary Education

In 1987 the Association of American Geographers was awarded a grant by the Fund for the Improvement of Post-Secondary Education (FIPSE) to establish a set of 'Centres of Excellence' in geographic education. Macalester was designated one of the centres and Lanegran was made Project Director for the AAG. The purpose of this programme is to create a set of new introductory courses which are focused on the sort of geography taught in the schools and not on the research frontier of the discipline. The tension between those who lead their geographic careers in the frontiers of research or methodology and those who teach geography to the next generation has always plagued our discipline. The FIPSE programme addresses the issue head on and argues that we need to recognise that many people who teach geography in our schools do not think of themselves as geographers. Therefore, it is incumbent on geographers to determine what aspects of our discipline are essential and must be taught to all secondary students. Then we must work with in-service teachers to develop materials which will enable those fundamentals of the discipline to be taught most effectively.

During the summers of 1988 and 1989 thirty teachers will come to Macalester to go through an institute focused on the content of a new introductory course in geography. They will attend lectures on the content of geography and will prepare materials which can be used in a variety of school settings. Upon completion of the institute experience, they will demonstrate the new materials in their school districts.

Conclusions

The lack of a highly centralised school system in Minnesota means that all significant change must be brought about through change in each district. We have begun the long process of enhancing geographic education by working with those teachers who are most inclined to do some work on their own teaching materials. We have brought them to a intensive summer institute session both to mold them into a cadre and to create new materials for use by others. The support of our efforts by the National Science Foundation, the National Geographical Society and the Fund For the Improvement of Post-Secondary Education has made up for the lack of state funds for geography. We have begun a system whereby teachers can exchange the units they have produced for their own use. At this point the exchange is in the take-off phase. Each year more teachers want to participate. But the key to this exchange process is the group of teachers who have passed through the institute and who share a bond with the other institute alumni. Our great challenge will be to expand the set of teachers willing to exchange their materials.

A RELATIONSHIP BETWEEN CURRICULAR CHANGE AND TEACHER TRAINING

Burrell E. Montz

ABSTRACT

A distinct lack of geography in elementary and secondary grades in the United States has culminated in curricular changes in New York and other states. In New York, however, there are currently no proposals to change certification requirements to incorporate the new developments. In addition, the training of in-service teachers must focus on three steps: developing an interest among teachers to incorporate geography in their courses, increasing their knowledge of geographic concepts and skills, and making available resource materials to aid them in teaching. These steps are recommended as necessary to insure that the curricular changes find their way into classrooms.

INTRODUCTION

Much has been said and written about the lack of pre-collegiate geographic education in the United States, resulting in calls for the incorporation of more geography in curricula (See Manson, 1981, for an example). However, this cannot be successful without adequate classroom materials and without teachers who are suitably trained in basic geographic concepts and skills. Efforts to rectify these problems have been made since the early 1960's. For example, the High School Geography Project, begun in 1961, attacked the problem of materials by

"...producing a brand-new, one-year high school geography course" (Gunn, 1972, 7).

More recently, the National Geographic Society has directed efforts toward teacher training through their Geographic Alliance Network (Salter, 1987). It is noteworthy that these programs focused on different aspects of education (teacher training in the latter versus improving materials in the former). However, both programs recognized that a curriculum cannot succeed without teachers able to present geographic material properly.

This all serves to point up the problem. In the United States, geography is commonly taught in the social studies, if it is taught at all, and not as a distinct part of the curriculum. This problem is aggravated by the fact that teachers may not be trained to teach geography--they are trained to teach social studies. However, curriculum changes suggest the need for changes in teacher education. This paper addresses these issues and focuses on the current situation in New York State. New York provides a good case study because it has recently revised its secondary Social Studies Curriculum to include more geography. As a result, there are opportunities for professional geographers to assist in curriculum implementation. The new curriculum also points up deficiencies in teacher training that have to be resolved.

CURRICULUM DEVELOPMENT IN NEW YORK STATE

The State Education Department (SED), under the direction of the Board of Regents of the University of the State of New York, was charged with revising the State's secondary social studies curriculum. The curriculum was divided into studies of United States and New York State History (Grades 7 and 8), Global Studies (Grades 9 and 10), and United States History and Government (Grade 11). Discussion will focus on the Global Studies curriculum because of its direct application with geography.

The revised curriculum, as published, states specific goals and objectives that it is designed to achieve. In addition, a syllabus detailing a course of instruction recommended by SED has been distributed. This syllabus presents suggested content, major ideas, and model activities for each unit in the course.

> "This syllabus is meant to be used by school district administrators and teachers in developing their local social studies curriculum" (State Education Department, 1987, 1).

The secondary curriculum will culminate in student examinations that cover the stated goals and objectives of the curriculum. These examinations are devised under the auspices of the Board of Regents. Thus, while the syllabus is presented as a guide to curriculum development, straying far from it will probably result in low grades on the examinations by the students in a particular school or school district. This reflects as much or more on teachers, as it does on students. As a result, there is a heavy reliance on the syllabus. Then differences come, in part, in how well teachers present the material and, therefore, in how competent they are with it.

The Global Studies Curriculum

The 9th and 10th Grade Curriculum on Global Studies presents both opportunities and problems for geographic education. The opportunities are centered around the curriculum's focus on the similarities and differences of regions of the world. Specifically, one goal is

> "... to create a cohesive two-year program in global studies that demonstrates the commonalities and linkages that are shaping our world civilization" (State Education Department, 1987, 22).

Thus, the knowledge that students will gain of places and their locations will increase as the curriculum is implemented, as will knowledge of basic geographic concepts such as regions, cultural diffusion, and interdependence and linkages.

It must be recognized, however, that this increased knowledge will be neither easy to accomplish nor quick in coming. Indeed, the draft curriculum that was circulated by SED in 1986 showed a poor understanding of geographic concepts and of geography itself. As an example, the term "geography" was used to mean physical characteristics of a place. After review by professional geographers, this was changed in the final draft. However, we cannot expect teachers to get the concepts across if those developing the curriculum do not understand them. The second major problem with the curriculum is that, as presented, it does little more than offer a trip around the world over two years. The result will be a student view that social studies classes are a place to learn about different countries, their people and products, rather than places to develop a perspective of the globe. Thus, some continuity and connections among the places studied are needed, and it will be up to the teachers to present them.

APPROACHING TEACHER TRAINING

Given a mandated curriculum that is specific in its goals, objectives, and content, it is apparent that the way to develop the curriculum to its fullest is through the education of teachers. This can be accomplished in two ways. The first is through revised state requirements for the certification or licensing of teachers, and the second is through in-service training for certified teachers.

Certification of Teachers.

As the curriculum changes, there must be a concomitant change in the educational requirements for teacher certification. That is not currently the case in New York State, although changes in the certification requirements are being proposed. If our expectations of teachers are changing, as reflected in the new curriculum, then it follows that requirements to become a teacher should change as well.

In New York State, current certification requirements for a secondary level social studies teacher include (among others)

36 credits in any combination of social science coursework and 12 credits in education coursework, beyond the bachelor's degree. This usually constitutes between 12 and 16 graduate courses. Therefore, a social studies teacher who may be working with the Global Studies Curriculum can obtain certification without any coursework in geography. Given such a scenario, the teacher's focus may well be a trip around the world, and students will not develop geographic skills that can be applied to analyzing different countries and regions. Thus, we are producing teachers who are not at all equipped to handle the subject matter.

This points up the need for specific training that is related to one's future job responsibilities. If a student is training to be a secondary level social studies teacher, then he/she should have depth in one area and content in one or two related areas. Thus, a student may specialize in history but also have some background in geography and economics. This is superior to the current situation that allows students to select from a menu of courses and disciplines, to develop little or no focus, and to obtain no depth.

In-Service Teacher Training

Changes in certification requirements do not affect those who are already permanently licensed, but they, too, must be able to teach the new required curriculum. Given that "the education of teachers must be a continuing process" (Graves, 1978, 77), strategies must be devised to improve, and in some cases develop, the geographic skills of social studies teachers.

Several steps should be followed in developing a strategy for in-service teacher training. First, it is necessary to develop an interest among teachers. What has to be recognized is the motivation for change. Even the new curriculum in New York State makes it possible for teachers to continue as they have been teaching, emphasizing history from a global perspective and adding a few place names. Why should or would teachers seek additional training? Answers to this question can range from a sense of professional responsibility to existing reward systems (i.e., salary increases) to a desire for more knowledge. It is important that the teachers' needs and goals for additional training are recognized and addressed directly. In New York State, we now have many social studies teachers who feel ill-equipped to teach the new curriculum, and they are seeking immediate assistance as well as long-term training.

Once the interest in retraining is developed, the issue of curriculum content must be addressed. What do we as professional geographers think teachers should be teaching? How can we help teachers incorporate geographic concepts in their lessons? What are the current geographic skills of the teachers and how can they be developed? In an in-service program, therefore, it may be useful to show slides of maps, air photos, and of the ground and to ask questions that allow teachers to analyze the slide from a geographic perspective.

Similarly, a teacher with a background in history might be comfortable handling the issue of human use of the environment by contrasting European settlement and land use in the United States with that of the Indian population. The goal is to allow the teacher to develop geographic skills within a familiar context.

There are, of course, a variety of approaches that can be taken to train teachers to increase the geographic content of their courses. They can range from training teachers to ask specific geographic questions to increasing their working knowledge of maps and locations. In New York, one of our biggest tasks is to develop ways for teachers to connect the regions in the Global Studies curriculum. A program that merely addresses the world, region by region, is doomed to create the bland diet that challenges few and stimulates none. Thus, a content area that can be used is some geographic issue such as human-environment interactions (eg., deforestation in Brazil and desertification in Africa or responses to flooding by different cultures) that provides a transition.
This second step, defining the content of teacher training, is critical because this is what will be translated to students in the classroom. A trade-off must exist between infusing geographic information and concepts into a teacher's mind and developing his/her geographic knowledge and interest.

Another step in teacher training centers on resource materials. It has been recognized that "teachers perceive that materials are lacking" (Salter, 1987, 211) and usually rely very heavily on the textbook (Sesow and Sorensen, 1987). Teachers cannot teach geography well without adequate materials, including maps and statistical sources. Teachers may not have ready access to sources of information. In addition, there are numerous sources of geographical data (Fryman and Wilkinson, 1985) that teachers may not be aware of nor have readily available.

The issues surrounding resource materials have to be addressed in any training program. It may be that all teachers need are the proper materials. On the other hand, recognition of the types of resources available may spur other teachers to add or strengthen the geographic content of their courses. This is not to suggest that adding maps, statistics, and good textbooks is all that is needed. However, when combined with the first two steps, the cycle of teacher training is complete. None of the steps can stand alone.

SUMMARY

Adding geography to the curriculum is necessary to educate students about the globe and its linkages. However, those developing a curriculum must have a good sense of what geography is and why it is important. Similarly, a concurrent change in certification requirements for social studies teachers will lead to more teachers who are better able to teach the curriculum.

There is also a recognized need to train in-service teachers to add geography to their courses. These programs must be organized around developing an interest, defining content, and incorporating resource materials. These steps build on one another and will produce teachers who have the content knowledge and skills to teach geography as part of the social studies curriculum.

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CONTINUING EDUCATION OF GEOGRAPHY TEACHERS: REFLECTIONS ON EXPERIENCE

by Sally Naish and Michael Naish

ABSTRACT

Continuing in-service development of teachers' knowledge, skills and values is seen as crucial to the quality of children's education.

Various forms of in-service provision, including involvement in short courses, award bearing courses, school based curriculum development work and reactions to national initiatives are critically reviewed.

Priorities for future development are considered.

INTRODUCTION

This paper offers reflections on the type and scale of continuing in-service education for geography teachers in England. It is based on the authors' experiences across a broad spectrum of in-service provision including university courses in geographical education and school-based departmental work; a wide range of provision that is, from award bearing courses to the immediate and pragmatic 'one-off' input.

CRITICAL ROLE OF CONTINUING EDUCATION

We view continuing in-service education as crucial to the quality of children's education for several reasons. In-service education (INSET) is concerned with both staff development and curriculum renewal and development. For the teacher it can provide essential up-dating of knowledge and understanding about the discipline. Such inputs are essential with an effervescent, dynamic subject such as our own.

The development of a teacher's skills is no less important. Examples are classroom skills like handling group work or role play, working in a team, organising fieldwork, managing coursework assessment. The whole area of values education too, demands attention. Geography teachers grappling with values education for their students are almost certainly in need of similar experiences for themselves. Heightened awareness of pertinent issues is a valued outcome of continuing education.

For this kind of work it is, in our experience, very important for teachers to get out of the classroom, out of their normal milieu, that is, in order to reflect back objectively on what happens there. Sharing ideas, resources and experiences with colleagues both within the staff team and from other schools and colleges can be of immense value, particularly if this takes place within the context of curriculum change. Such work is likely to encourage the continuous reappraisal of the curriculum through analytical and constructive evaluation: a vital part of the teacher's task.

Considering the very short time spent in initial training for geography graduates who take the Postgraduate Certificate in Education, a positive attitude towards continuing in-service work would seem to be essential. The nature of such work should be carefully considered as there is, in our view, a distinction to be drawn between the benefits of short term inputs and those of longer term award-bearing courses.

Work in the local Teachers' Centre related to a particular issue or initiative provides an example of a short term input. This is likely to be practical and pragmatic, focusing on an immediate need. The longer term award-bearing course is more likely to consider theoretical underpinning, to relate theory and practice and to achieve personal as well as professional development.

RECENT STIMULI FOR INSET

There have been several developments in England and Wales over the past fifteen years or so which have provided welcome stimuli for the development of in-service education for geography teachers. These developments have encouraged a range of different INSET inputs.
The earliest stimuli came from the Schools Council Projects, details of which are well known (see Boardman (1985) for a summary of each project). The Geography 14-16 Avery Hill Project, Geography 14-18 Bristol Project and Geography 16-19 Project have all been much involved in encouraging in-service development through the challenge of curriculum change. The Projects established active local groups of teachers, provided a range of courses and conferences and encouraged departmental teamwork through their ideas, materials and examination courses. For discussion of school based INSET related to the Geography 16-19 Project, see McElroy (1980), Pitts (1978) and Welch et al (1983).

There is no doubt that the establishment of the 'common examination at 16+' has been a major influence on INSET. The new examinations for the General Certificate of Secondary Education (GCSE) replace the previous dual system and will be completed for the first time in June 1988.

National criteria were established for each subject and new syllabuses devised on the basis of these. Innovations such as the introduction of a values dimension, increased emphasis on skills development and an element, at least 20%, of coursework assessment, have led to a considerable stepping up of in-service provision in an attempt to meet a clear need.

Developments at the 17+, or pre-vocational level, including a new cross-disciplinary course, the Certificate of Pre-Vocational Education (CPVE) have created a similar impact. The same can be said for the Technical and Vocational Education Initiative, funded on an unprecedented scale through the Manpower Services Commission. Special funding has been made available to support this government initiative through TRIST (TVEI Related Inservice Training).

Perhaps the most far-reaching of recent developments on the continuing education front is the new scheme announced in August 1986 to improve 'the quality of teaching and further the professional development of teachers' through support for Local Education Authorities (LEAs) in training teachers. The intention is to help the LEAs organise in-service provision more systematically to meet needs and priorities.

The new scheme, originally known as Grant Related In Service Training (GRIST), came into effect in April, 1987. The main point is that to be eligible for grant aid, Local Authority expenditure must be related to 'certain selected national priority areas' and 'locally assessed needs and priorities' (DES 1986).

It is significant, from the point of view of the geography curriculum that the list of national priority areas (Appendix I) does not include the cultural side of the curriculum, environmental matters and political education. By June 1987 it was clear (Williams, 1987) that geography did not figure prominently in priorities as shown by the Local Authority bids. There was an obvious need for geographers to clarify their requirements so as to ensure that curriculum development as well as staff development could take place.

A CASE STUDY OF RECENT INSET EXPERIENCES

The following reflections are provided by one of us who has been 'on the receiving end' of the recent initiatives considered above, working as Head of Geography in a large mixed comprehensive school.

"It is now eighteen months since the first bids were submitted under GRIST, and the panic caused to many Heads of Departments by the forms asking for needs, priorities and above all, costing of courses, is still fresh in my mind. How, without guidelines, does one cost a speaker on the use of satellite imagery in the classroom, for example? However, with the characteristic competitive streak that seems to affect Heads of Departments in most subjects when money is to be allocated, most people seemed to respond by asking for as much as possible in order to get *something*.

"Thought was stimulated, for many people for the first time, on what INSET needs there *are* both for the Department as a whole and for individuals. Personal involvement was required. The school INSET Coordinator in this London Borough of Bromley school, then had the task of 'balancing his books'. Several problems arose initially because it was not always clear which 'pocket' the money would come from. If a Departmental priority was recognised as a Borough priority or a National priority, then the higher organisation paid, which left 'spare' departmental INSET money for other purposes.

"It was possible to budget for courses that take place on an annual basis outside the Borough, for example, the University College London Geography Department course for sixth form teachers, but it was not possible to consider occasional courses for which the details are not received until the term before, even if they relate to needs. Course organisers will have to plan much further in advance and also take into consideration slow dissemination of information within Education Authorities.

"A third difficulty has arisen with large departments. Ideally there should be time in school for departmental work, to discuss the curriculum, to disseminate information from courses and for work with probationary teachers. There are five members of staff in my Department and it has proved impossible to get supply cover for such a large number. There are always supply teachers in school for absent staff, but there are just not enough supply teachers to meet INSET needs. This also applies to interdepartmental work.

"A fourth problem concerns longer courses. The plans of individual teachers for M.A. courses or single term courses in the local institution of higher education have often had to be shelved because schools could not afford to allocate large sums of money for course fees for one person. Some part time studies have continued, or are being commenced by individuals financing themselves. By April 1988, approved part time courses, if accepted by the

Local Authority, will be supported centrally instead of by the individual school.

"In Bromley, the contribution of the full-time M.A. students who work in the Borough has been considerable upon their return from the course. They have taken responsibility for much of the INSET work, having returned with drive and enthusiasm which has been communicated to other teachers and Departments. The present limited movement and promotion has actually ensured that the skills acquired on these M.A. courses have returned to the Borough.

"On a personal level in my own school, a comprehensive school of 1200 girls and boys, the first term of INSET operated on several levels:

1. The Borough's priorities, which include such matters as Computer Assisted Learning (CAL) and Information Technology (IT) are financed by the Borough. This yielded a three day course, open to all geography teachers, to which most schools managed to send one member of staff for most of the time. Some people came and went during the course. This continued INSET which had been in process for one or two years as a twice-a-term, after school meeting at the Curriculum Development Centre (CDC), housed in part of one of the primary schools.
2. Borough priorities in school yielded half a day of INSET for all teachers in theory on the above topics. This was organised on a departmental level for my Department's needs by the Computer/IT specialist. It was held at the end of the Summer Term, when, because fifth and seventh year pupils have left, there is more time.

For the Department, four out of five of us had half a day's work on databases (GRASS and QUEST) in geography. A whole day would have been much better.

3. One member of staff went to Queen Mary College, University of London on a one day course offering up-to-date research ideas and information for teachers of sixth form geography. This was disseminated to other members of the Department by means of duplicated sheets.

4. The plans made in 1986 for departmental time were over-ridden by the Borough allocation of a whole day at the end of the Summer Term for GCSE training, when pupils were given an extra day's holiday.

5. A GCSE half day was also allocated by the Borough for Heads of Departments in school. This was of limited use except for administration and was followed by a half day consultation by all Heads of Departments on field-work in GCSE at the CDC.

"This represents the first term only of the implementation of GRIST. The summary does not consider any subject other than geography and does not take into account the Geography 16-19 Project Advanced level courses planned by the Borough, not as a Borough priority, but as a response to the needs recognised by the teachers. Many Borough schools are changing to the '16-19' Advanced level course as a good follow-on from GCSE in September 1988.

"The description above does not consider the ways in which we might use time and money 'saved' by the Borough having the same priorities as the teachers!

"The system has the potential for great improvements in INSET for the majority of teachers, many of whom have done very little in-service training due to lack of interest or provision, but it has disadvantages for a smaller number of individuals who wish to further their knowledge and skills to a major extent through study for higher degrees as opposed to the minor scale of Borough training.

"As the GRIST scheme, now renamed Local Education Authority Training Scheme (LEATGS) moved into its second phase, many of us have become more skilled in identifying needs, recognising and reacting to National and Borough priorities and planning the allocation of £4410, the grant for our fifty members of staff. This has to cover fees, travel, materials, supply staff etc. and with supply cover at £60 per day, it is not an easy task to fulfil the needs of the whole school!"

CONCLUSIONS: A BALANCED PROGRAMME

There can be little doubt that one of the casualties of LEATGS has been the longer term award-bearing course. An example of this is the course for the Master of Arts degree in Geographical Education offered at the University of London Institute of Education. This course is one year full-time and two years part-time and there is little doubt that, particularly for full time students, there are great advantages to be gained from an in-depth examination of issues in geographical education. Subsequent career patterns of many students provide evidence of the value of the course.

The obvious need is for a careful consideration of the whole pattern of provision for continuing teacher education in order to arrive at effective balance for staff development and curriculum renewal and implementation.

In our view it is crucial to link the two. What really matters is the experience gained by children and students in the classroom and in the field. This depends on the quality of their teachers as well as the nature of the curriculum and the two are inextricably linked.
At present there are a range of opportunities for in-service work. These include: in-school personal or departmental work; in-school inter-departmental work; Teacher Centre programmes organised by teams of teachers or Local Authority advisors; school-based curriculum development related to national or local initiatives (long term or short term inputs); longer term award-bearing courses. Local Authorities and head teachers should ensure whole staff involvement in appropriate patterns of provision across this range and, most important of all, more time (and therefore money) should be available for such work as well as for effective preparation and evaluation of student activity and learning.

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APPENDIX I

NATIONAL PRIORITY AREAS FOR GRIST (LEATGS)
from DES (1986)

Priority areas for school teachers:-

1. Organisation and management and the responsibilities of head teachers and other senior teachers.
2. The teaching of mathematics.
3. Special educational needs of pupils with learning difficulties.
4. Industry, the economy and the world of work.
5. The teaching of science.
6. The teaching of craft, design and technology.
7. The curriculum in a multi-ethnic society.
8. The teaching of microelectronics and the uses of microelectronics across the curriculum.
9. The teaching of religious education.
10. The General Certificate of Secondary Education.
11. Helping to combat misuse of drugs.

Utilizing Non-College Geographers to Stimulate Geographic Change: A Cost Benefit Analysis

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This paper is based on three assumptions:

1. The status of geographic education in the curriculum of the United States, and other nations as well, is low, and has been in such a position for at least three decades.

2. Professional geographers, while interested in the health of the discipline to which they have given their professional lives, have generally neither knowledge of, nor involvement in, strategies for the rectification of this low status of geography in the K-12 curriculum.

3. A significant new role player must be brought on the scene if this low curriculum status is to be changed, for all of the current influences have done little to stop the decline of the profession since World War II. A primary force in this innovation must be the energized K-12 classroom teacher.

The prime motivation in the writing of this essay, and the presentation of this paper, is to promote the discussion of the power and impact a new role player in curriculum reform has achieved in the American educational scene. The new role player is called the Geographic Alliance. The teacher is central to its utility.

The Three Assumptions. The first two assumptions are so fundamental that they are to be dealt with in only desultory fashion since the real message here is the vitality of the Geographic Alliance and the associated role of the classroom teacher.

Within the past three years, and particularly within the past year, the American public has been bombarded with a litany of statistics proclaiming the gross levels of American geographic ignorance. As a result of such media attention, the first assumption can be supported by looking either at the absence of explicit geography in curricular guidelines, or at the outcomes of varied formal and informal student tests. The evidence of this reality is apparent all around us.

The second assumption is part of the "culture" of being a professional geographer in virtually any college or university. The rungs on the ladder to advancement are clearly hewn from effectiveness in research, writing, publishing, and teaching--in that order. This reality is, also, evident all around us.

The simple rationale for finding a new role player is that no single force has done very much to arrest the disappearance of geography from the American classroom since the 1950s. We have geographic--as well as social studies--organizations that have been present throughout the demise of the discipline. It is clear that geography needs a new model if we are to reinstate the discipline in the schools.

The nature of the new role player. As is so often the case in basic innovations, the new element that has led to some success in this battle for an improvement in the image of geography and consequent curricular change is at once both obvious, and simple. The role player is a collaborative of classroom teachers, professional geographers, and educational administrators. This coalition is called a Geographic Alliance. And the most monumental force in this innovation is not the college geographer, but rather the classroom teacher newly empowered through Alliance activities.

The real benefit from this modest unorthodoxy--moving the power from the hands of the ivory tower professional to the classroom professional--touches the lives of all who share a concern for the role of geography in American education. Consider the roles that these three populations play in this teacher-geographer-administrator collaborative.

The teachers provide the knowledge of the K-12 educational scene, and some knowledge of the process of curriculum design. Geographers have generally focused their professional lives on the content of geography, but have grown increasingly aware of the diminishing levels of geographic competence that characterizes their new students. The administrators have come into this coalition because of the energy generated by the productive interaction of the classroom teachers and the geographers.

The impact of this trio of educational professionals has been remarkable. The Alliances they have formed have been responsible for considerable increase in the public's call for more geography in the K-12 curriculum. These same people have been able to be productive in curriculum reform, improved teacher training, and in drawing more professional geographers into the arena of educational improvement. This has been a critical feature of the new model, and where it has worked it has done so because of the resource that the classroom teachers represent. They, as they become newly caught up in the reform and teacher training activities associated with the Alliance, have taken increased responsibility for the overall effectiveness of the Alliance. This has been a critical factor in the academic geographer's decision to increase levels of personal involvement.

What is the nature of the cost-benefit analysis of the Geographic Alliance?

To the classroom teacher the major cost for involvement in the Alliance has been additional hours after school, on weekends, and in the summer because of the heavy promotion of inservice activity. It is difficult to chart the total of such hours, but an approximate 3-5 hours a week for the moderately active Alliance teachers is probably accurate. This is a cost that teachers bear generally without any financial compensation and, in fact, there may be out-of-pocket costs in travel and materials as they become more fully involved.

To the professional geographer the most significant cost is the time investment in meetings with teachers and other professors, in phone calls, in correspondence, and in additional time in curriculum committee meetings. The fact that Alliance evolution has meant an increasing proportion of the leadership responsibilities have been assumed by classroom teachers makes the Alliance movement more attractive to academics commonly disinclined to participate in such an uncommon effort.

For the educational administrator, the most obvious cost to bear is the time that it takes to convene these two populations, although that role is most generally played by the academic geographer. The hidden--but very real--cost is the demand for new materials, for support for teachers to come to meetings, to make presentations, and for the district to provide more resources for inservice presentation opportunities.

What are the benefits of this simple but traditionally uncommon collaboration? For the teacher, perhaps the greatest benefit is the establishment of a forum for productive interaction not only with college geographers, but with other teachers who share the same interest in geography. This interaction has been effective in increasing the teachers' sense of professionalism, and this leads to a productive and creative enhancement of their self-esteem. Geography gains a great deal with this transformation.

For the college geographer, this Alliance proves to be stimulating because of the energy generated by the encounters with the teachers. There is also the sometimes heady sensation of truly doing something for education as you see media and school attention come to the Alliance's work in curriculum reform. The process can also be satisfying as the professor sees discussions with teachers leading to better teaching strategies in the lives of both populations.

The administrator has the reward of seeing productive educational reform take place through the cooperative venture of the two populations...two who should always work together, but two who seldom do.

What then can be said about the balance between costs and benefits of this innovation? If one reviews the patterns of geography-related curriculum change for the past forty years, it can be quickly determined that the Alliance has been relatively successful in galvanizing the broadbased, grassroots support that has a special authority in American educational reform.

For the three most involved populations, this Alliance participation has been, primarily, a source of professional growth and satisfaction, a civic and social outlet for professional energies that have not before had such an arena of activity, and apparently acceptable time expenditures. It is for these reasons that one sees the Alliance movement assuming a respectable and even significant niche in the professional lives of geographic educators.

Conclusions:Classroom teachers bear the brunt of student geographic ignorance. Traditionally, they have been little assisted by academic geographers in efforts to modify such ignorance. The Alliance movement has brought together geographers and classroom teachers and the latter have taken on a major role in energizing a campaign for enhanced and expanded geography in American education. The emergence of such a role in the mid-1980s has meant a good deal for all of the populations involved. With such teachers active in leadership roles both geography and American education will benefit.

ALLIANCE GEOGRAPHERS AS POLITICAL LOBBYISTS

Douglas C. Wilms

Abstract

This presentation outlines the lobbying efforts of an Alliance Geographer and suggests that more activity in the political arena could work to improve the status of geographic education in American schools.

Introduction

America's political leaders are becoming increasingly interested in the status of geography and geographic education. This new interest represents the recent illumination that their constituents are some of the most geographically illiterate voters found in any of the world's industrialized societies. Geographical ignorance is now being discussed in the halls of Congress where the nation's schoolchildren are referred to as "globally illiterate." (CR, Senate, 7781, 1987). More than one member of that august body has expressed their shock to learn that 96 percent of some of the nation's brightest college students cannot locate Vietnam on a world map. The National Geographic Society's Geography Education Program, often referred to as the Alliance Project, has focused upon a networking system designed to work at the local school level to foster change in the realm of American geographic education. The Alliance Project could prove to be a powerful lobbying force.

The Need

Public discussion of geographical illiteracy mirrors a new awareness brought about by a concerned media as well as geographers themselves. For example, geographers in various departments of the North Carolina University system administered a pretest dealing with geographic facts to introductory college classes in the fall of 1984. Some of the student answers suggested Dublin is in Ohio, Lima is in Italy, and the Amazon River is in Egypt. Knowledge of United States geography was not much better. Indeed, less than 50 percent of the North Carolina students knew that Alaska and Texas are the nation's largest states. The results of the test did not surprize the geographers but did shock members of the media who picked up the story. The story of the North Carolina survey is used now in a seven-paragraph report in the 1987 Almanac under the title "Geographic Illiterates." (Almanac, 1987, p.480). Finally, this survey has even become a part of the Congressional Record. North Carolina's Senator Terry Sanford referred to it in his support of "Geography Awareness Week" when he stated: "All of us in this Chamber are, of course, aware that Alaska and Texas are our two largest states. However, a 1984 University of North Carolina survey revealed, to both my surprise and dismay, that over 50 percent of college students tested did not." (CR, Senate, 7780, 1987).

National attention fosters local attention, and at the local level no one politician is more important than a state's governor. Because education is such an important local issure, many governors establish elaborate education platforms and programs and even refer to themselves as "education governors." In some states the education budget is the single largest component of the state's budget; in these states all governors are "education governors."

In August, 1986, Gilbert Grosvenor, President of the National Geographic Society, wisely took his geography education campaign to a meeting of the nation's governors in Hilton Head, South Carolina. He urged the state leaders to help eradicate geographic illiteracy nationwide. In February, 1987, the National Governors Association, in response to the continued efforts of geographers, President Grosvenor and his Society staff, and the national media, adopted a new policy on international education. The association recommended that, in order to foster geographic and cultural awareness, that states begin: 1) to teach geography as a distinctive subject in K-12 instruction; and 2) require geography as an element of teacher education programs. The later component is especially important when it is realized that just 5 percent of the nation's teachers have taken a course in world geography.

Why is it that congressmen and governors must concern themselves with school curriculum, geography, international studies, and global education? The answer is partly because there is no national social studies curriculum in the United States. State and sometimes local school districts are free to establish their own curriculum and rarely is geography accorded the status found in other industrialized societies. Gilbert Grosvenor said it all too clearly when he remarked, "Geography is now being covered--perhaps I should say buried--in social studies and history, assuming that it is taught at all."

Unfortunately, geography is rarely a required course of study in American schools. In many schools the subject isn't even offered as an elective. These conditions clearly suggest why Americans are so geographically illiterate and why concerned leaders are trying to raise the nation's level of public awareness. One such effort led to a joint Congressional resolution designating November 15-21, 1987, as "Geography Awareness Week." Numerous gubernatorial proclamations also enhanced geography awareness at the state level during the same week.

Geographers as Lobbyists

Geographers should take advantage of the media's concern with geographical illiteracy by meeting with their state representatives and senators. As an educated member of the constituency, the geographer can present articulate and reasoned arguments for offering more geography in the social studies curriculum. As there is an abundance of evidence that geographical ignorance is a serious problem in the United States, geographers need only to refer to their own classroom experiences or share with politicians the results of diagnostic tests and national surveys. The results of many of these surveys, such as the one conducted in the University of North Carolina system, are readily available for reproduction and distribution.

Because the education budget represents such a sizable component of local budgets, educational issues are always of paramount concern among local politicians. These officials spend countless hours debating educational policies, programs, teachers' salaries, and even curriculum. Indeed, their interest in curriculum seems to be growing in recent years. For example, legislators have played key roles in introducing curriculum reform that includes new study areas such as economic education and law-related studies.

Politicians are forever looking for good, innovative, and progressive ideas and/or platforms that set them apart from their opponents. Geographical literacy, global awareness, and international understanding are positive concepts that receive much favorable press in light of this nation's concern regarding its ability to compete in international trade. It is becoming increasingly clear that an ignorance of geography places Americans at a disadvantage with other countries in matters of business and trade. State leaders are realizing that international trade is as much a local issue as it is a national issue. The North Carolina World Trade Association, for example, has gone on record as supporting the efforts of the National Geographic Society and the North Carolina Geographic Alliance. When an educational issue gets the support of the business community, politicians tend to pay close attention to it.

The Alliance geographer should leave to the the National Geographic Society both national and congressional lobbying efforts. The Society has the resources and the location to accomplish this end. It is at the local level that Alliance geographers should expand their efforts in the political and business arenas where they can address curriculum reform.

Curriculum reform through official education channels is a slow and tedious process where geographers will always find themselves outnumbered, and usually outgunned, by the combined forces of professional social studies educators and historians. It is a frustrating and exhausting task to fight entrenched, self-interest groups on behalf of geographic education. Conseqently, it is recommended that attempts at curriculum reform be undertaken outside formal education channels using the influence of local political and business leaders. Using such channels, the author managed to solicit a $50,000 appropriation from the North Carolina General Assembly to the North Carolina Geographic Alliance. The appropriation was subseqently matched with funds from the National Geographic Society. These funds are used to host in-service teacher training workshops and summer institutes. A network of enthusiastic educators teaching the fundamental themes of geography will serve as a catalyst for curriculum reform.

The Approach

Lobbyist geographers will have to spend some time outside of their traditional haunts. Political rallies, caucusus, and fundraising events are to be attended, not avoided. Chamber of Commerce committees, business and trade associations, and civic and fraternal groups are always looking for guest luncheon speakers. Nothing will grab your audience's attention faster than a display of diagnostic world maps depicting your home state as a Canadian province or the United States located in Brazil. Geographers appalled at the status of geographic education will find a host of allies waiting to help them spearhead curriculum reforms.

Rallying politicians and businessmen is a long-term commitment. A steady barrage of polite letters, followed by National Geographic Society reprints, national surveys, and an occasional diagnostic map, will help keep our curriculum goals uppermost in the minds of our state and local leaders. Well-developed state Alliances should not fail to have their members write to their representatives. An avalance of letters demanding curriculum reform will not go unheeded.

Conclusion

State social studies curricula change slowly. On average, they are reviewed by an appointed evaluation committee every ten years. Rarely are professional geographers appointed to these committees, and when they are, they find themselves vastly outnumbered by historians and other social scientists. As a consequence, geographic education continues to languish in the tailwinds of curriculum change. These facts suggest alternative approaches to change should be explored.

The National Geographic Society, under the leadership of Gilbert Grosvenor, is leading the way in focusing national attention on the problem of geographical illiteracy. Using the National Geographic Magizine and other publications, the Society has been most successful in this endeavor. At the local level the National Geographic Society-supported Alliance program is designed to foster in-service teacher training and establish a network of educators who are concerned with improving geographic instruction. Each year the Alliance network trains hundreds of teachers to teach geography in their respective school systems.

Local efforts designed to effect curriculum change should be added to the efforts already described. These will require geographers to assume a more public posture than they have done in the past, but the new posture will hasten the achievement of their goal of geographic literacy. Lobbying is a time-honored format of the American political system and there is no reason why it shouldn't be practiced by geographers at the local level.

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CONTINUING EDUCATION OF GEOGRAPHY TEACHERS
- THE SINGAPORE EXPERIENCE

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Introduction

Pre-service training for teachers provides them with the essential theoretical background knowledge and some of the basic skills to function in the classroom. To ensure the continued growth and professional development of teachers, in-service education[1] is necessary. The training provided should also enable the teacher to keep pace with changes and developments that are continually taking place in the various cognate fields and in other specialized areas.

Preparation of the Beginning Teacher

In Singapore anyone aspiring to teach must complete a formal course of training at the Institute of Education, the only teacher training institution in the country which conducts pre-service training of teachers for the schools. The pre-service programmes comprise the Diploma in Education programme, which aims to prepare graduate teachers to teach at secondary and pre-university levels, and the Certificate in Education programme, which prepares non-graduates to teach at the pre-primary and primary levels.

As a subject geography is taught only in secondary schools in Singapore though elements of Geography form part of the social studies course taught in elementary or primary schools. It is a compulsory subject in the first two years of secondary school but beyond these levels it is offered as an elective.

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[1] In the context of this paper in-service education is defined as those experiences which are designed to improve and upgrade the professional knowledge and performance of teachers in their assigned responsibilities.

Each student teacher who intends to teach geography as his major or minor subject in school is required to take a sixty-hour course on methods of geography teaching known as a Curriculum Studies Option in addition to other courses which make up the Diploma in Education programme. The course, which comprises five themes, viz. Subject Matter, Instructional Methods, Learners, Assessment and Evaluation and the Learning Environment, is designed to prepare the student teacher to function at the secondary and pre-university levels. The emphasis is on assisting student teachers to acquire a repertoire of classroom-based teaching strategies (exposition, role-play, simulations, problem-solving etc.) as well as organizational and practical skills in field-based approaches. Lectures and discussions also focus on the aims and objectives of teaching geography, the development of curriculum projects (both local and foreign) and practical tasks like analysing the syllabus, selecting media for use and developing test items. Such tasks attempt to provide student teachers with the practice in applying educational principles dealt with in the theoretical component of the Diploma in Education programme. In addition micro-teaching sessions enable student teachers to practise teaching skills under simulated conditions before they begin actual macro-teaching or teaching practice in schools.

The In-service/Continuing Education of Teachers

In Singapore the Institute of Education is primarily responsible for the initial and in-service training of teachers. In-service courses in geography as well as in other subjects of the secondary school curriculum are usually conducted by the Institute of Education at the request of or in collaboration with the Ministry of Education (MOE). Broadly such courses fall into two main categories:

- Mandatory courses
- Courses for professional growth

Mandatory Courses

These are courses which are mounted in response to meet new needs and changes or revision in syllabi for e.g. Teaching the New Geography Syllabus at Secondary One and Two levels[2]. Such courses are given high priority and affect all teachers teaching the particular subject. For the course stated above a total of 298 teachers were required to attend.

Courses for Professional Growth

Courses in this category are mounted for the purpose of enrichment and up-dating. These courses, independently initiated by the Institute of Education or in consultation with MOE, enable teachers to acquire specific teaching techniques and skills in the teaching of particular groups of pupils. Examples of such courses are:

- Teaching Geography to Slow Learners.
- Teaching Geography through Fieldwork.

Participation in these thirty hour courses is voluntary and the response to such courses has been favourable.

Conducting Agencies

Though the Institute of Education has the responsibility of planning and conducting in-service courses several other agencies are also involved. These are:

- the Ministry of Education.
- the Curriculum Development Institute of Singapore - a division within the Ministry of Education.

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[2] The new syllabus was first introduced in 1983 to replace the old syllabus which focussed on the study of world regions. In contrast to the old syllabus the new syllabus emphasises the learning of basic geographical concepts rather than the mere acquisition of facts by rote learning.

- the Geography Teachers Association.
- the Department of Geography, National University of Singapore.

Nature of Courses

The courses run by these agencies differ in nature and contents. Among the courses conducted by the MOE are:

- Study Skills for More Effective Learning.
- The Use of Specific Instructional Objectives for Effective Teaching and Testing.

These courses conducted by specialist inspectors from the Curriculum Planning Division of the Ministry of Education take the form of school-based workshops.

The Curriculum Development Institute of Singapore has the specific function of designing and developing materials based on prescribed syllabi to meet the needs of different cognate areas. Its task is to disseminate such materials and to monitor their use in schools. Like the courses run by the Curriculum Planning Division of the Ministry, the CDIS courses are of short duration designed to meet specific needs of teachers.

Courses by the Department of Geography, National University of Singapore focus on content and geographic techniques. These courses are mounted to familiarise geography teachers with developments in the subject. One such course conducted recently by the Department of Geography is Enquiry Skills and Field Techniques for 'A' level Geography Teachers in which participants are exposed to field techniques such as slope measurements, stream channel mapping, weather observations and recording as required by the revised 'A' level geography syllabus set by the University of Cambridge Local Examinations Syndicate.

In contrast to courses mounted by the University, the Institute of Education concentrates its in-service training efforts on improving the pedagogical skills of teachers in all subjects. Over the years a variety of courses for secondary school geography teachers has been conducted. Of these courses, the course on the Teaching of Geography through Fieldwork has been most popular and especially well received.[3] A total of 105 teachers have participated in this course since it was first conducted in 1985. To date four courses have been conducted.

Basically the aim of the course is to familiarise Geography teachers with the procedures and techniques of field studies and to equip them with the necessary skills and knowledge in planning and conducting field studies in physical and human aspects of Geography for their students. At the end of the thirty-hour course it is expected that participants would have learned the skills of:

- planning field studies
- designing worksheets
- collecting data by observing, interviewing, and measuring
- data analysis and presentation
- evaluation

and would be competent in conducting field studies for their students.

Nonformal courses in the form of half-day workshops and field trips are organized by the Geography Teachers Association for its members as well as non-members. Other activities by the Geography Teachers Association include seminars and talks on subjects of geographical interest.

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[3] The contents of this course are shown in Appendix 1. Selection of course contents is closely tied in with the prescribed Geography syllabus for 'O' level.

As and when needed the Ministry of Education in collaboration with the University of Cambridge Local Examinations Syndicate also conducts induction courses for Geography teachers to familiarise them with changes in syllabi, examination requirements and assessment procedures. These courses are mandatory for all Geography teachers preparing classes for the 'O' and 'A' level examinations in Geography. The full range of courses conducted by the various agencies is shown in Appendix 2.

Future Trends in the Continuing Education of Teachers

Up to now in-service training of teachers has been organized on an ad hoc basis. The Ministry of Education has recently proposed a plan to provide a comprehensive 3-stage framework for the continuing professional development teachers in Singapore's schools.

Stage 1 - Induction training (first two years of service) to help new teachers fit into the school situation upon completion of training.

Stage 2 - Additive training (3rd - 10th year of service) targetted at newly confirmed teachers and those during their initial years of teaching.

Stage 3 - Advanced or specialized training during remaining years of their service to enable the more experienced teachers to develop specialist knowledge in their subjects, and refresher courses to keep themselves up-to-date with the latest developments in the teaching of their subjects.

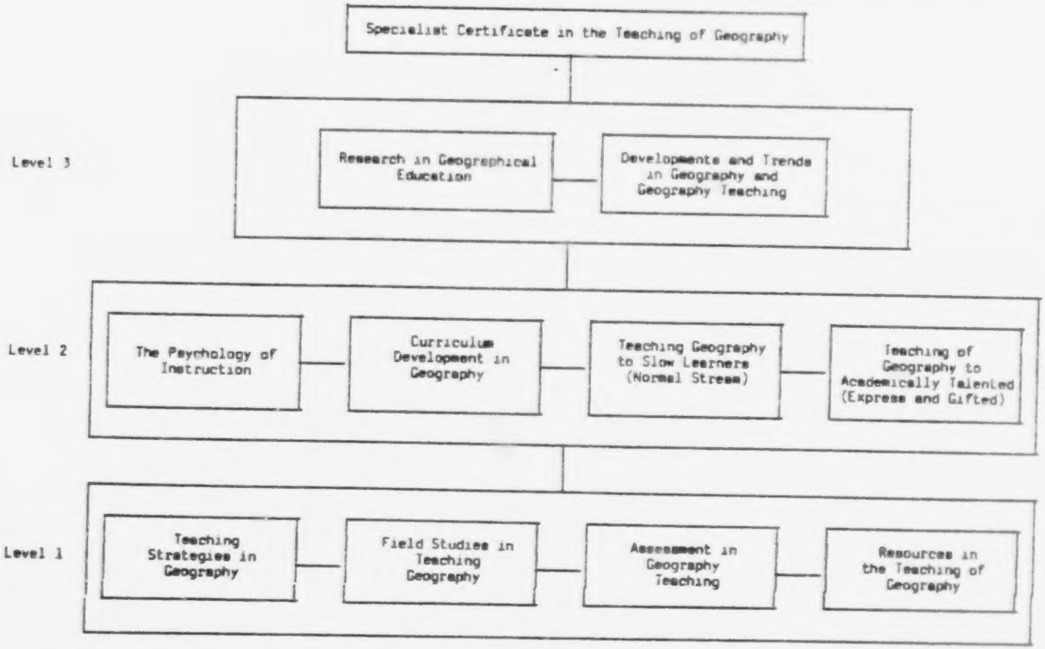
All teachers including those teaching Geography would be expected to go through the three levels of training as part of their continuing professional development and eventually attain the advanced specialised level.

The Specialist Certificate in Education

As an alternative to the Ministry of Education proposal, a Specialist Certificate in Education has been proposed by the Institute of Education. This particular course of study is designed to produce the teacher specialist in one cognate area e.g. Teaching of English Language, Science, Geography that is of vital concern to the professional performance of teachers and schools. The programme has a three-tiered structure: the first tier is labelled introductory, the second present-oriented and the third future-oriented. The first tier is introductory in the in-service sense. It seeks to build upon basic skills and knowledge acquired during pre-service. The second layer focusses on current practices in Singapore schools, the problems and issues and the probable solutions. The third tier deals with action research, future trends in school organization, new skills and knowledge.

Each tier is made up of 2 - 4 modules (there are altogether ten). Modules at level 1 are an extension of pre-service courses. They focus on concepts, principles and processes with their concomitant skills or competencies. Level 2 modules extend current practice to innovative approaches, concepts, principles, processes and their concomitant skills which reflect the state of the art in teaching a particular subject. Level 3 modules focus on the work and function of the subject specialists in future-oriented and action research activities.

For the Geography teacher in particular, the proposed Specialist Certificate in Education will be an opportunity to pursue the subject in greater depth and to acquire advanced pedagogical skills that will enhance his competence as a specialist in a cognate area and his prospects for advancement. The tentative framework for the Specialist Certificate in the Teaching of Geography is shown in the diagram on the next page:


Specialist Certificate in the Teaching of Geography
Level 3
Research in Geographical Education
Developments and Trends in Geography and Geography Teaching
Level 2
The Psychology of Instruction
Curriculum Development in Geography
Teaching Geography to Slow Learners (Normal Stream)
Teaching of Geography to Academically Talented (Express and Gifted)
Level 1
Teaching Strategies in Geography
Field Studies in Teaching Geography
Assessment in Geography Teaching
Resources in the Teaching of Geography

Conclusions

From the discussion in the preceding pages it is clear that after the conclusion of their initial phase of training, teachers need to engage in continued learning in order to acquire new skills and up date their knowledge if they are to grow professionally. For this reason there should be a conscious and systematic effort to provide teachers with the means to upgrade and keep pace with the rapid changes in subject matter as well as in educational theory, pedagogical techniques and practices in schools.

Though the Institute of Education has the primary responsibility of providing pre- and in-service training for teachers in Singapore it alone cannot cope with such a massive undertaking. It would require the co-operation and co-ordinated efforts of the Ministry of Education, other institutions of higher learning and teacher organizations like the Geography Teachers Association to achieve this goal.

It is however encouraging that steps have already been taken to provide various avenues for teachers not just geography teachers to gain further professional competence through the Specialist Certificate in Education and other advanced courses locally and abroad.

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Appendix 1

Geography In-Service Course

Teaching Geography Through Field Studies

Course Contents

- Role and Importance of Field Studies in Secondary School Geography

  Approaches to Field Studies

- Planning, Organization and Implementation of Fieldtrips

- Field Studies in and Around the School

  Exercise in Microclimate

- Study of a Stream in the Bukit Panjang Catchment Area
- Case Study of a Village - Kampung Sungei Tengah
- Rocks and Weathering Processes
- Location Factors in Industry -

  A Case Study of the Jurong Industrial Estate

- Field study in the Central Business District of Singapore
- Presentation of Field Projects
- Summation and Evaluation

Appendix 2

In-Service Courses in Geography

1983 - 1987

		Conducting Agencies						
Year	Course	MOE	IE	CDIS	NUS	GTA	OTH	No. of participants
1983	1. Writing of Instructional Objectives for the Normal Course.	X						-
1985-1986	2. Drawing up of one-year Plan for Geography Programmes.	X						-
1985-1986	3. The Use of Specific Instructional Objectives for Effective Teaching and Testing. (Secondary Level)	X						377
1986-1988	4. Designing Better Geography Examination Papers. (Lower Secondary Classes)	X						102
1987-1988	5. Learning Skills for Secondary School Pupils.	X						396
1983-1986	6. Teaching the New Geography Syllabus for Secondary One and Two Levels.		X					303
1985-	7. Teaching Geography Through Fieldwork.		X					105
1986-1987	8. Teaching Geography to Less Able Students.		X					56
1987	9. Reading Strategies for Effective Learning from Texts.			X				180

Conducting Agencies

Year	Course	MOE	IE	CDIS	NUS	GTA	OTH	No. of participants
1987	10. Effective use of AV Materials.			X				180
1986	11. Evaluation of Geographical Education.			X				120
1985	12. Teachers as Curriculum Developers.			X				80
1985	13. Teaching Geography to 'N' Level Pupils.			X				130
1984	14. Teaching of Geography for Upper Secondary School.			X				120
1983	15. Teaching of Industrial Geograpy.			X				-
1986	16. Concepts in Lower Secondary Geography.				X			
1987-	17. Enquiry Skills and Field Techniques in Geography for 'A' Level teachers.				X			18
1985	18. Conference on the Biophysical Environment of Singapore and its Neighbouring Countries.					X		112
1985	19. Geographical Fieldtrip to Java, Indonesia.					X		
1986	20. Induction course for 'A' Level Geography Teachers.						X	41
1987	21. Geography Marking Workshop for 'O' Level Teachers.						X	225

Curriculum developments in geography for the 1990s

Theme-7 (Curriculum Development in Geography in the 1990s)

ABSTRACT

PLANNING A GEOGRAPHY CURRICULUM FOR INDIAN SCHOOLS

(Dr.U.C.Aggarwal)

In India, education is a state subject. Each state develops its own curriculum and text books in all the subjects and for all the stages. Therefore, the variety in the Geography curriculum also at school stage exists from state to state. During the last few years, some measures have been taken by the Union Government for maintaining uniform standard of education in the states to do away with the disparities in the curriculum etc. and to achieve the national standard of attainment by the learners at school stage by setting up an autonomous organisation-National Counsil of Educational Research and Training in 1961 under the Ministry of Human Resources Development, Deptt. of Education (Formerly Minister of Education). The curriculum and text books, prepared by it are being used in all the contral schools spread all over the country and abroad and also in the schools under the control of some states and Union Territories. The counsil has also prepared currently a 'National Curriculum Framework' to keep in touch with the current developments at the global level and to fulfil the requirements of present needs of country laid down in the current 'National Policy on Education,'86 to meet out with the forthcoming challenges in the next decade and also to be prepared for the 21st Century.

In this curriculum framework, Geography has got much more importance at the entire schol stage. From class 1 to 5, it will be taught under environmental studies and from class 6 to 10 under social studies. The objectives of teaching Geography, units & topics of study and the curriculum for each class have been logically framed and brought-out very recently. The basis of framing the curriculum of school Geography and emphasis given have been discussed.

PLANNING A GEOGRAPHY CURRICULUM FOR INDIAN SCHOOLS

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Geography of today, unlike the past, is an interdisciplinary subject and serve as an important link with both the humanities and social sciences. It covers a vast field and comprises of many branches of scholarship in its fold. Like the bee, it sucks honey from every flower. Its subject matter consiquently lends to and borrows interest from physical, biological and social sciences as it includes physical sciences like physics, chemistry, mathematics and astronomy on one hand and natural and humanistic studies like botany, zoology anthropolgy, sociology and history on the other. Thus, geography like any other science, derives its raw material from other sciences and it employs the derived raw material from its own angle and its own manner. It is but natural to bring-out the changes in its concept and subject matter as the concept and material of other subjects is now undergoing into transformation and expanding fastly.

Our experiences conclude that the geography of today is quite different from the geography of yesterday and the geography of tomorrow will certainly be different from that of today. In other words, changing world results in changing geography and changing geography makes us adopt changing ideas in teaching geography. The world of today is shrinking but our ideas of teaching about the geography of the shrinking world should be expanding. So it is not more geography that is needed to be by over loading the syllabus, but more curricular changes must take place at all levels of school education if the powerof the discipline of geography is to have its maximum effect. It is not more information and more factual knowledge that should be stuffed in the minds of young but more meaningful generalizations and concepts should be developed. The challenge of today is to make the approach to study or mastering geography more problem-finding or inquiry oriented. Geography is a discipline of very responsibe to the problem of today's world. Geography, more than any other subject maintain close link with the real world. Hence, the need of updating the curriculum and adopting the new approach to study geography in schools is accepted by all to meet the challenges of the present world and the future.

In India, geography is one of the oldest subjects taught at the school stage. It is being taught even at the university level since 1921, when the Department of Geography was established in Aligarh University, Aligarh. The development of geography in India received great impetus as a result of the economic progress ushered in by the country political independence in 1947. It is a compulsory subject taught from class Ist to 5th standard under environmental study and 6th to 10th under social studies curriculum. At the senior secondary stage i.e. 11th and 12th standard,it is an elective course and increasingly becoming a popular subject. It is being offered by a sizable number of studdents at this level. The social studies approach is being utilized to some extent in the primary, middle and secondary stage but seperate geography instruction at the senior secondary stage is considered more important than the social studies approach in the curriculum.

The objectives and approaches of teaching geography throughout the country are more or less the same but there is a wide variety in the geography curriculum from state to state followed in Indian schools. The main reason is that education is a state subject in the country and each state develops its own curriculum and text books in all the subjects and for all the stages. Therefore, the variety in the geography curriculum also at school stage exists from state to state. During the last few years, some measures have been taken by the union government for maintaining uniform standard of education in the stages to doaway with the disparties in the curriculum by the learners at school stage by setting-up an autonomous organisation-National Council of Educational Research and Training in 1961, under the Ministry of Human Resources Development, Department of Education(Formerly Ministry of Education). The curriculum and text books, prepared by it, are being used in all the central schools spread all over the country and abroad and also in the schools under the control of some states and union territories. The counsil has currently prepared a national curriculum framework to keep in touch with the current developments at the global level and to fulfil the requirements of present needs of country laid down in the current 'National Policy on Education,'86 to meet out with the forthcoming challenges in the next decade and also to be prepared for the 21st century.

This centrally developed national curriculum which is based on some essential learnings and the common scheme of studies is reffered by the Indian Government as an core-curriculum. An important aspect of core-curriculum is its emphasis on instilling a nationally shared perception and values and creation of an ethos and value systems in which a common Indian identity could be strengthened. Therefore, the core curriculum will emphasise the essential learnings related to the following areas of national importance and which are considered essential for strengthening a national identity:

- Projection of India's composite culture and preservation of cultural heritage and resources.

- Kindling a profound sense of patrotism and a pride in being Indian through the teaching of India's freedom struggle and acquainting them with the sacrifices made by people belonging to different communities and regions and the heroism of common man.

- Promotion of national and social integration and cultivation of values as enshrined in the constitution through curricular, creative and cultural activities.

- Protection of environment and conservation of nature and natural resources and energy.

- Creating an awareness of correct appreciation of the impact of scientific advancement and technical development.

- Contemporary social and economic issues and problems such as population-growth, socio-economic disparities etc. and measures for ameliorating them.

- Inculcating in the people, a respect for constitution and creating awareness of the fundamental rights and duties of citizens.

- Observance of small family norms and equality of sexes.

The above core elements are to be introduced in the whole curriculum for the entire school stage. Some of these such as, the protection of environment and conservation of nature, natural resources and energy, creating an awareness of correct application of the impact of the scientific advancement and technical development, contemporary social and economic issues and problems, observance of small family norms and inculcation of scientific temper may be introduced easily through the curriculum of geography. Thus, the responsibility of geography in achieving the national goals, performing the social responsibilities and meeting the challenges of today's world is being increased day by day. The educationists administrators & planners are aware of it. Therefore the curriculum and the text books of geography for Indian schools are being revised in such a manner so that they may be with the confirmity of the national objectives or the national policy. A brief outline of the revised curriculum of geography for school stage developed by the National Counsil of Educational Research and Training in accordance with the national policy of education, 1986 is being presented stage wise.

Lower Primary Stage:

At the lower primary stage, i.e., in class I to V, geography is taught under environmental study. In grade I and II, the child is introduced to environment as a whole without making any clear cut distinction between natural and social elements that go into its making. In grade III to V, while the environmental focus should continue, the physical and social aspects of the environment is introduced into the social studies as a broad and composite area of study, parallel to general sçience. The social studies at this stage widen the child's mental horizon from his home, school, neighbourhood to state, country and the world through history, geography, civics and economics subject. But among all the four subjects geography has got quite good place. About 15% of the total school hours is to be devoted for the study of geography at this stage. The proposed course content of geography at primary stage is given below:

Class I (Home and school)

i) Identification of basic needs
ii) Study. of family
iii) Study of school

Class II (The Neighbourhood)

i) Services offered in neighbourhood
ii) Geographical setting of neighbourhood
iii) Life in the neighbourhood

Class III (Our state and country)

i) Geographical setting of the state.
ii) Life of the people in the state.
iii) The state as a part of India

Class IV (Our India)

i) Our country-natural regions and life of the people in different parts.
ii) Use of natural resources.
iii) Important routes and means of communication.

Class V (India and the World)

i) Broad study of the globe.
ii) Life of the people in some other parts of the world.
iii) The shrinking world.

Upper Primary stage

The age and the attainment of the pupils at this stage and the use that the majority of them would make of geography in later life preclude the study of world geography in terms of regions alone. Therefore, the suggested social studies programme proposes the geography of the world as an independent branch of the syllabus. This part of syllabus includes the broad principles of physical geography geography of continents and geography of India in detail. About 12% of the entire schools time is to be given for the geography.

The principles of physical geography are basic to the study. The many terms that occur over and over again in geography, have to be grasped and the concepts behind them clearly comprehended so that they form the foundations of geographical under standing. The syllabus of this stage follows developmental approach. Instead of taking all topics together and teaching them in one class, they have been distributed over the three classes, and graded in the order of difficulty and complexity.

The syllabus at this stage suggests the study in terms of contents, wherein regions can play their important role in the understanding of nature of geography of every continent. The study of geography of world, therefore, revolve around (a) location, size andshape, (b) physical features and drainage, (c) climate (d) natural vegitation,(e) population,(f) economic resources, agriculture, forest and minerals (g) economic development industries and trade.(h) transport and communications (i) a brief geographical account of some important countries. The class wise distribution of continents have been made very logical and presented as under.

Class VI

a) Physical
   i) The Earth - Our Planet
b) Regional
   ii) Africa - Land and people
   iii) South America- Land and people
   iv) Australia- Land and people
   v) Antarctica -Land,climate,vegitation, wildlife and
      Exploration with special reference to
      Indian expeditions.
c) Practical
   vi) Practical work- Map reading

Class VII

a) Physical
   i) Atmosphere and hydrosphere
b) Regional
   ii) North America- Land and People
   iii) Europe- Land and People
   iv) The Soviet Union- Land and people

c) Practical
  iv) Practical work- Studying the weather and the night sky.

Class VIII
a) Physical
  i) Lithosphere and landforms
b) Regional
  ii) Asia- land and people
  iii) India- Physical Setting
  iv) India- Natural resources
  v) India- Human resources
  vi) India- Economic development

c) Practical
  vii) Studying local maps

Secondery Stage:

The students at the upper primary stage have already covered elementary principles of physical and economic geography and life of the people in different parts of world which will provide a sound basis for studying the subject in greater depth at this stage. By this time students are able to see and understand world patterns of natural and cultural phenomenon; as for example surface forms, climate, natural vegitation, agricultural and mineral resources, distribution of population and patterns of economic and social development. This knowledge will help them in understanding the world problems and also develop interest in studying other subjects as economic, political-science and history. Keeping this is view,the geography syllabus has been divided into two parts. The first part consists the physical and economic geography of world and the second with physical and economic geography of India. The 12% of the school time is to be devoted for the study of geography at this stage. The general organisation of the syllabus for this stage is as follows:

Class IX (Man and Environment)

  i) Map skills
  ii) Man's natural environment
  iii) Natural resources and their distribution
  iv) Human interaction with the environment

Class X (Geography of India)

  i) Physical features, climate, natural-vegitation and wildlife.

ii) Natural resources.
iii) Developing our resources
iv) Field studies/project work

Under this revised pattern of geography curriculum for school stage, a regional and descriptive treatment of the own state as a part of the country with special emphasis on the life and work of man is in 3rd standard. A simple treatment of the general geography of the home country (India) with special reference to the activities of man is in 4th standard. In 5th standard, the study of life of people in other parts of world alongwith the broad study of the globe is placed. Fundamentals of the regional geography of the world on a continental basis and home country(India) on a descriptive basis with physical geography in outline is for an intellectual understanding of the geographic forces of the life of man are in standards 6th to 8th. Although not expressly mentioned in the syllabus as a an seperate item, practical geography in the shape of map work is to receive in every class the emphasis it deserves. It can best be done by co-rrealating physical geography with regional geography with examples taken from the continents under study. In standards 9th and 10th, the physical and economic geography of world with special reference to India is prescribed. A little bit of practical geography in form of field studies and project work alongwith the physical, human regional and economic geography has also got the place at secondary stage. An important aspect of the entire geography curriculum is its emphasis on instilling a nationally shared perception and values. Protection of environment including conseruation of resources and saving it from pollution and degradation, promote national integration and international under standing, observance of the small family norms, equality of sexes inculcation of scientific to temper are being considered particularly relevant for developing the text books of geography based on the current syllabi. Now we hope that we will be able to meet the challenges of the next decade as well as get insight for better understanding of the perspective world.

POLITICS AND PRACTICALITIES: DEVELOPING GEOGRAPHY IN THE SECONDARY SCHOOL CURRICULUM OF ENGLAND AND WALES, 1976-1988

PATRICK BAILEY

Abstract This paper describes recent developments in geographical education in English and Welsh Secondary Schools in the context of radical changes taking place across the whole school curriculum. Most of these changes result from governmental intervention on a scale unprecedented in British educational history. It shows how the place of geography in this turbulent period has been secured, mainly through the efforts of a newly-politicised Geographical Association; and it analyses conditions at school level within which the subject is now being developed. It is hoped that this British experience may be helpful to geographers in other countries where periods of drastic curriculum reorganisation are in hand or pending.

INTRODUCTION

In the period up to about 1965-70, most school geography remained at the level of explanatory description. Many men and women who are now influential in educational affairs, national and regional, received their education in this period and so believe that geography is still as it was then. Consequently, they see no place for the subject in the robust, vocationally-orientated curriculum which it is government policy to develop. The re-education of senior administrators about the educational possibilities of modern geography is therefore a major task for geographers. It is also a hard one, because early prejudices die hard.

The reconstruction of geography into the dynamic subject it now is began in the universities about 1965 with the 'quantitative revolution': this turned out to be the beginning of a root-and-branch revision of the subject, which is continuing. Developments in the universities were translated into forms suitable for use in schools remarkably quickly; and most of this translation was carried out by teachers rather than by academics. This was possible because of the high level of professional competence of the majority of the British school teachers; and this resource of dedicated, able and well educated teachers has been and continues to be the foundation upon which all curriculum reform in Britain is based.

In Britain, it has never been the tradition that central government, as represented specifically by the Secretary of State (Minister) for Education and Science, should express a view about what schools should teach or how they should teach it. The 1944 Education Act, upon which the whole school system is based, effectively dispersed responsibility for the curriculum among Local Education Authorities, the governors of schools and head teachers, the latter in practice having most influence. However, the Examination Boards which control public examinations in practice maintained an 'agreed syllabus' in school geography as in other subjects through their syllabuses and question papers. Examination work dominates British schools, so that this 'agreed syllabus' virtually controlled everything that was taught in schools above the age of about fourteen.

Since 1976, this long-established situation has been changed by direct governmental intervention in all aspects of education, and at all levels. In particular, the school curriculum became a matter of centrally generated public debate. A period of tumultuous change followed, accompanied at one stage by a long-running teacher strike. In this turbulent period, it became clear that pressures were developing which might well lead to the elimination of geography from large parts of the school curriculum: and that responses to these pressures would require political as well as professional, academic action. There follows a short account of how this response was organised under the leadership of the Geographical Association, the principal organisaton in Britain devoted to the study and teaching of geography in schools.

INTERVENTION AND RESPONSE: MAKING THE CASE FOR GEOGRAPHY

Central government intervention began overtly in 1976 when Prime Minister James Callaghan (Labour) suggested in a speech at Oxford that what schools taught was a matter of public concern because it influenced the economic performance and social well-being of the nation. In particular he pin-pointed four areas of concern: the teaching of basic skills, literacy and numeracy; the content and methods of the comprehensive school curriculum (attended by over 90% of the school population); appropriate educational provision for the 16 to 19 age-group; and public examinations.

The Great Debate, as politicians occasionally called it, began slowly at first: other and more pressing matters engaged the public mind; but after Callaghan's Labour administration was replaced in 1979 by the Conservatives led by Margaret Thatcher, it gathered momentum. Proposals for innovation followed thick and fast. During this period, Her Majesty's Inspectors of Schools produced several very important reports and series of suggestions, especially A View of the curriculum (HMI,1980). The Department of Education and Science (the administrative arm of government) in turn produced a series of consultative documents which advanced from debate towards the practicalities of implementation, notably The School Curriculum (DES, 1981) and the White Paper, Better Schools (DES,1985). All these documents had implications for the place of geography in schools and the Geographical Association replied to and commented upon all of them.

A further major innovation was the establishment of an entirely new body, independent of the DES, the Manpower Services Commission. This set about creating an alternative, vocationally-orientated educational path to that provided by the DES. It was made clear that the new MSC courses were intended for all pupils, of all abilities, not only for the less-academic. MSC posed a challenge to the continued existence of geography in the kind of curriculum it proposed: but it also offered opportunties for geographers to adapt their subject to its new frameworks. Many seized these opportunities with both hands and their departments flourished as a result, at least for the time being.

By 1980 it was evident that what was decided as a result of the various initiatives and consulations would shape British education for many years to come: and that geography would have to justify its place within the new dispensation at every stage. Nothing would be taken for granted.

It was at about this point, or so it appeared to the writer, that the Geographical Association fully accepted its role as the defender and advocate of geography in the schools, because no other body could or would do so. Rex Walford put the situation in a nutshell in his Presidential Address to the Association at Easter 1984 when he said: "The past decade gave us the luxury of debating the kind of geography we wished to teach; but in the 'eighties the focus has changed. The debate is now about whether geography should or should not be taught at all" (Walford, 1984). David Boardman has written a succinct account of all the developments up to June 1985 in which the Geographical Association was involved (Boardman 1986).

As soon as it became clear that the Secretary of State for Education and Science was personally interested in the curriculum and that the government intended, as soon as possible, to establish a National Curriculum, closely linked with a new criterion-referenced common examination at 16+, the honorary officers of the Geographical Association realised that they must put the case for geography to him directly. Largely through the initiative of Rex Walford, President for 1983-4, it was arranged that Sir Keith Joseph, the Secretary of State, should address a special national meeting of the Association on 19th June, 1986. On this historic occasion it was evident that Sir Keith had taken his task seriously and that he was thoroughly briefed about recent developments in geography and its claims to make unique, significant contributions to the curriculum. In his speech Sir Keith challenged the Association to reply to a series of questions about these contributions. As President for that year, the writer set up a 'task force' to prepare a reply, the short form of which was sent to the Secretary of State in about six weeks (Bailey, 1986). A much fuller reply was then prepared by a representative group of the Association's members and published in 1987 under the title A Case for Geography (Bailey and Binns, 1987).

During this period, HM Inspectors also produced their own comprehensive aplogia for geography in schools, Geography from 5 to 16: Curriculum Matters 7 (HMI, 1986).

There was now a change in Secretary of State. Sir Keith Joseph retired and was succeeded by Mr. Kenneth Baker. It was therefore necessary for the Geographical Association to put the case for geography directly to him. This was done on 30th June 1987, on the occasion of the publication of A Case for Geography. At this meeting, the Secretary of State assured the Association's representatives that he regarded geography as an important part of any curriculum and that it would be included in his forthcoming National Curriculum proposals. This was indeed the case. It was listed as a Foundation subject in The National Curriculum 5-16. A consultation document which appeared in July (DES, 1987a). However, in this document geography was listed in association with history and worries remained that a proper place for it would still not be found in many schools. However, in the draft Education Bill which was put before Parliament in November, geography was listed as a Foundation Subject in its own right (DES, 1987b).

Neither the consultation document nor the Bill itself make specific recommendations about the way courses should be organised in schools. Provided that the elements of the National Curriculum are properly represented, a school may arrange its programme to suit its educational philosophy and staff expertise and to take advantage of local conditions. This freedom places a major responsibility for course development upon heads of departments.

The post of head of department is not recognised by the current salary structure of British schools, yet is is now more important than ever before. The incumbent of such a post must now be not only a first-rate geographer and teacher but also an expert representative of the subject and its teachers in the school. This is still an unfamiliar role for many heads of departments, who were mainly appointed because of their good teaching. For some years, management training at departmental level has been regarded as a high priority by Local Authorities; and the Geographical Association is currently preparing a handbook on management matters.

DISCUSSION: WORKING WITHIN THE NEW FRAMEWORKS

1. Promotion and diversion of effort

It is widely recognised that geography has long been taught notably well in many schools. Further, the scope and methods of the subject tend to encourage geographers to think in cross-curricular, integrative ways. As a result, many geographers have been appointed to headships, deputyships and other administrative posts in schools. A rapid survey of one English Local Education Authority's schools in 1988 shows that there are more geographer heads and deputies than representatives of any other subject.

The tendency to promote geographers has lately increased as a result of the many new developments taking place in schools, most of which call for cross-curricular co-ordination. Examples of the new posts include, TVEI (Technical and Vocational Education Initiative) Co-ordinator; work experience co-ordinator; careers adviser; examinations registrar; and professional tutor, in charge of staff development. Such posts can only be filled by experienced teachers with a proven record of adaptability, enterprise and organising ability; and many geographers have these attributes. Many have therefore been appointed into such posts. These in fact may be their only opportunities for promotion because this is seldom given for good teaching alone. Unfortunately, some of the ablest geographers are thereby taken out of geogaphy, to the detriment of the subject's further development. The writer knows formerly dynamic geography departments whose members can now almost never meet to discuss geography because of their whole-school responsibilites.

2. Falling Rolls

During the 1970's and 80's, school rolls have fallen, by as much as one-third in many urban catchments. Schools have shrunk, merged with other schools in order to maintain viable teaching groups, sometimes closed. This contraction has had severe staffing consequences for geography departments, as for all others. The most significant has been the increasingly widespread use of non-specialists to maintain the teaching programme. The adequate induction, in-service training and support for such non-specialists is now a central problem for school departments. Time and other resources are rarely allowed for this. Inadequate teaching by non-specialists poses a threat to the standing of geography in any school.

3. Pressure to Combine Subjects

The new initiatives already mentioned have produced intense pressure upon finite curriculum space with the result that some long-established activities have been dropped and time for others has been reduced. One favoured solution to the problem of curriculum congestion has been to compress geography and history, sometimes with religious education and even English, into some form of combined or 'integrated' course. Such a course then receives little more time than any one of its component subjects used to do.

Irrespective of the intellectual quality of such combined courses (and in the writer's experience these range from the challenging and substantial to the conceptually inept), the threat to the proper teaching of geography by a drastic reduction of time is obvious. It may be possible to maintain the internal balance of the subject by a careful re-appraisal of priorities, which is a good thing in itself; but time may in fact be so restricted that no balanced and reasonably full treatment remains possible.

Combined courses will continue to be an option for schools faced by intense curricular pressure. It follows that criteria for such courses need to be formulated and applied by geographers and others. The writer has suggested elsewhere that such courses should build upon work already done; lay adequate foundations for more specialist work higher up the school; demonstrate relationships between different kinds of knowledge; give pupils a balanced experience of what it will be like to learn each subject; and excite the pupils by their high quality. Because all geography is founded ultimately upon fieldwork, it may be argued that a fieldwork element should be included in the geographical component of any foundation course (Bailey 1987).

A further question concerns staffing. As soon as a combined course is proposed, geographers have to consider vey carefully indeed how to staff their parts of it. The quality of geographical teaching in a lower school combined course may well determine how many and which pupils will opt for it later. Therefore, foundation course teaching should never be left solely to non-specialists or to the most junior teachers. To do this is to risk cutting geography off at its roots in the school.

CONCLUSION

This paper began by noting that the difficulties of school geography were rooted in the non-development of the subject in a critical period. The present period is equally critical. The future prosperity of geography therefore depends upon its continuing development as a unique field of study, one which illuminates the human condition in ways which no other subject can. Geography's greatest educational contribution at this time is to provide young people, future voting citizens, with a serious study of humanity's dependence upon natural environments, upon the successful management of which all our futures depend.

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REDEFINING THE CORE AT 16-18; THE BRITISH EXPERIENCE

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ABSTRACT

The core of geography at 16-18 is being changed pragmatically as a result of practical developments in the English and Welsh education systems. The factors determining the hidden agenda of redefinition are examined as political and disciplinary pressures. The nature of the possibly redefined core in the form of The Advanced Supplementary Examination is discussed and the common elements of these new examination syllabuses are outlined as the potential new core for 16-18 geographical education. The potential consequences of these changes for the discipline are hypothesised. The whole redefinition is the direct consequence of political action manipulating a discipline into a hurried reformulation of its aims and objectives.

INTRODUCTION

This paper reflects upon the discussions which are taking place in the United Kindom on the nature of education for the 16-18 age group and the role of geography within the curriculum. A review of the background to the impending (and at this stage, probable) changes will highlight the pedagogic and pragmatic reasons for reopening a discussion which was only closed with the production of the Common Core statement on the discipline in 1983 (G.C.E. Boards, 1983). The introduction of a new examination, the Advanced Supplementary or A S which will be sat by its guinea pig candidates in 1989, might have become the unwitting forerunner for a revised Advanced Level Geography and examines the content of the approved syllabuses in an attempt to rediscover the core.

WHY REDEFINE THE CORE?

There are three primary reasons for the reform of 16-18 education. This paper does not cover the justification which lies within the perceived mandate of the present government since it came to power in 1979. Suffice it to say that the "new right" did believe that education should be more responsive to the needs of society and especially the world of work. To this end the 16-18 curriculum, which relied on advanced study of a small number of subjects in depth, was regarded as too restrictive and academic. The political context is also part of an overall strategy of reform of the examination system which has seen the introduction this summer of the GCSE (General Certificate of Secondary Education) replacing the former 16+ examinations and the current attempts to provide a national curriculum.

It has been the changes in the 16 + (O level and GCSE) examinations which are one pressure for change. The emphasis of the new 16+ examination was upon the development of a set of aims and assessment objectives which were related to broad areas of knowledge and understanding, skills and values against which the content of individual syllabuses was to be tested (GCSE, 1985). In particular the techniques of assessment were designed to ensure both Examination Board-based and school-based components. The guidelines also placed considerable emphasis on field study, contrasting areas at home, the trade relationships with e.g. the EEC, the study of the geographical aspects of environmental and social issues and the study of topics illustrating the totality of the subject as the study of the inter-relationships between people and their environments. In addition the approving body, The Secondary Examinations Council, developed its own subject-based critera instrument (S.E.C., 1986). Thus, as a result of these changes which have spawned 17 syllabuses at this level, (Cahart, Orrell and Wilson, 1986) it is hardly surprising that the teaching community has now turned its attention to 16-18 education. The Geographical Association has made the case that alterations in the methods of teaching and examining at 16+ neccessitated a reformulation of 16-18 essential because pupil and teacher expectations have been raised and realised by the new examination, a dubious claim made before a single candidate sat the examination (G.A. 1987).

Central government pressure to change the nature of all A levels was not new. In 1980 the government published "Examinations 16-18" (HMSO 1980) which first suggested a new intermediate level examination to be placed alongside the existing system and comments were invited. These resulted in the publication of "A S Levels" which had the declared objective of "broadening without diluting academic standards the curriculum for A level students" (D.E.S., 1984). These new examinations would cover not less than half the amount of the conventional A Level, taught over two years and would be assessed on the same standards as their sister examination. In the subsequent four years a series of syllabuses has been presented for approval so that at the time of writing in late 1987 six had been approved for examination in 1989.

The third reason for expecting change is the fact that in 1987 the government established the Higginson committee to review A levels. In its discussions which are still in progress, it has asked some of the examination boards whether they would like to see a wider range of A levels in the 16-18 curriculum and informed sources talk of five or six subjects. Questions have also been asked concerning the feasibility of modular syllabuses. In both cases it is not that difficult to surmise that such changes would necessitate a reduction in syllabus content and examination load if the changes came about. For this reason the preparation of A S levels could be regarded as the prototype for new A levels because the syllabuses have been prepared on the basis that two A S are equivalent to a single A level. Higher education in the form of the universities, polytechnics and colleges of higher education already accept this.

THE DISCIPLINARY CLIMATE

Geographers, in common with other disciplines, had already been asked to define the common core of their subject. In the paper prepared for geography (G.C.E., 1983) three approaches were considered; i) the selection of common elements from all existing syllabues, ii) the agreement of a body of knowledge which all agree is central and essential and iii) considering geography as a dimension or perspective of study and as a mode of enquiry. The latter approach was adopted and with it the view of the core as a set of concepts, skills and techniques. The general principles of the core emanate from this approach and are as follows:

i) An awareness of certain important ideas in physical geography, in human geography; in the interface between physical and human geography.

ii) An appreciation of the processes of regional differentiation.

iii) Knowledge derived from a study of a balanced selection of regions and environments linked with a broad understanding of the complexity and variety of the world in which the student will become a citizen.

iv) An understanding of the use of a variety of techniques and the ability to apply them appropriately.

v) A range of skills and experiences through involvement in a variety of learning activities both within and outside the classroom.

vi) An awareness of the contribution that geography can make to an understanding of contemporary issues and problems concerning people and the environment.

vii) A heightened ability to respond to and make judgements about certain aesthetic and moral matters relating to space and place.

In 1986 the geography 18+ committee of the Secondary Examinations Council did update these principles calling them aims. Aims i), iii), v) and vi) remain unaltered and the others were modified as follows:

ii) An appreciation of the spatial and temporal processes of environmental change and regional differentiation at different scales.

iv) An opportunity to develop skills in measuring, collecting, selecting, arranging, analysing, interpreting and presenting geographical data, including field investigation.

vii) A heightened ability to respond to aesthetic and other aspects of landscape and townscape.

Because all new syllabuses at A level now have to conform to the common core and because A S "standards should be as exacting as for A levels" (D.E.S., 1984) it follows that the new examination represents an attempt to redefine the core of the subject in terms of knowledge, understanding and skills.

A further pressure on the disciplinary climate has been the response to the perceived threat to the discipline posed by curriculum revision which resulted in a dialogue by the then Secretary of State, Sir Keith Joseph, and The Geographical Association, and between the permanent secretary, Sir David Hancock, and the Institute of British Geographers (Joseph, 1985, Bailey and Binns, 1987 and Hancock, 1986). These developments have reawakened geographers to the political and educational climate of the times and brought about a reassessment of the discipline from the realistic position of improving the public image of the discipline.

A third factor influencing the climate within the discipline is the attitude of the Examination Boards who need to maintain both their status within the profession and their profits from successfully administering the system. Therefore they have to keep abreast of the advances in geographical education as they perceive them through their advisory committees for each subject. In the case of geography that has meant the construction of A S syllabuses, despite some misgivings, and the acceptance that change is inevitable given the climate of opinion which is outlined above.

THE NEW SYLLABUSES

It is now possible to examine three variants of the new core as indicated by the A S syllabuses which have been approved by the Secondary Examinations Council within the past eighteen months. The first paradigm of the subject confirms the focus of the discipline as a study of people and environments, maintaining the breadth of the discipline together with the depth of study, e.g. The Associated Examining Board's syllabus, the first to achieve approval, and the London University Board. The second represents the attempt to take a curriculum framework and extend its use to A S level as it has to other areas of geographical education, the Schools Council 16-19 project. The third group follow the dictum of Everard et al (1977) who stated that, "it seems certain that the ever-present division between human and physical geography will widen". The Northern Ireland and Oxford Delegacy syllabuses in Physical Geography are the sole examples.

1. The AEB (1987) and University of London (London 1987)

The developers of the former syllabus were extremely pragmatic and recognised the fact that teaching resources could not stretch to the development of a totally distinct A S level in all but a handful of schools and colleges (Thomas, 1987). The subject content has been organised into seven core modules and six optional modules which branch from the core. Candidates select two core modules and then two option modules from two lists which have either a physical or a human bias.

The core topics are; the nature and trends of population growth, tectonic and hydrological processes, atmospheric processes, ecosystem, manufacturing and industrial development and location, and settlement forms and function, while the option lists are; A) population and resources, urban problems and planning and rural development problems and planning, B) changing coastline, environmental hazards, and ecosystem modification including agriculture. The emphasis in the titles of the latter group of options does illustrate the fact that the syllabus stresses the relationships between the physical and human which are also present in the detail of the core "physical" topics.

In theory every pathway through the subject matter involves the candidate in a balanced appreciation of the relationship between people and their environment and of the dynamic nature of the environment. Such a syllabus structure begs the question of the core and leaves its definition to the candidate/teacher. It is saying that there are many foci to the subject and that these may be combined in any fashion.

The London syllabus, like the AEB, also assumed that it would have to be taught alongside A level. It has therefore maintained the balance of its parent with sections on environmental systems, human systems and resource development and human welfare but it has pruned the content of the subsections. For instance, Hydrology is the sole geomorphological topic while economic activities are limited to the study of two subsistence and two commercial agricultural systems, two industries and two tertiary industries. This syllabus has chosen to limit the content by exclusion rather than by choice although, like the AEB, it has preserved the theoretical unity of the discipline by stressing interaction at a variety of scales. It also acknowledges the upward filtering of examination practice by accepting that candidates' performance can be achieved by marking all work on the basis of knowledge, understanding and application, skills and inter-relationships. In this way it has taken the practice, as yet untested at GCSE, and applied it to A S level assuming that the same assessment principles will be effective at both levels.

2. The 16-19 Project (London 1988)

This syllabus is also very similar to that of its parent in that its aims and assessment objectives are identical to the A level. Like the AEB format it has a system of cores and option modules through which a pathway is selected. The people and environment theme is more strongly issues based than the AEB syllabus. Finally its modular structure pioneered the approach which others have followed. The distinctiveness of 16-19 has always been that it is an approach to curriculum development which involves teachers and a commitment to enquiry based learning and its role in geographic education. This curriculum framework has spawned a GCSE for mature students and a module in BTEC. Critics do point to the constrained nature of this framework being available to candidates at different stages in their education process and to the coverage of the same material. As a consequence some do doubt whether this narrowly defined spiral curriculum can sustain student interest unless some new components are added to update the syllabus. Alternatively, certain concepts and ideas could be reserved for each examination so that the body of knowledge and concepts at each level is more distinct.

3. Oxford Delegacy and Northern Ireland Board

These syllabuses have merely taken the existing syllabus and utilised the physical half of the syllabus to which a project has been added. Such a development can represent a very jaundiced view of the subject which only pays lip-service to the inter-relationships that the other boards consider fundamental to the discipline. In fact approval was given on condition that the title was "physical geography" thus implying that this is not geography!

DEFINING THE CORE

Careful examination of the syllabuses approved to date other than those for Oxford and Northern Ireland does permit the identification of those areas of content and approach that are part of the "new core". Certainly assessment of performance by means of a project is now a familiar theme although approaches to assessment may vary in detail. In particular all of the examinations do require a similar methodology (Burtenshaw, 1988). The variety of assessment styles has increased and questions and data response are the norm alongside the assessment of some continuous prose. As yet decision making exercises are the preserve of 16-19 although they have a parallel in role playing questions from the AEB and the emphasis on values within the Northern Ireland scheme.

All the syllabuses pay considerable attention to the problem of scale and ask that all topics are covered at a variety of scales. Therefore place specificity is avoided except where the topic relates directly to a particular environment such as the Developing World. Within physical geography there has been some concern at the demise of the subject at this level in recent years (Taylor, 1984). Geomorphology seems to be focusing upon fluvial hydrology and, in common with other areas of physical geography, natural hazards. There is some slight emphasis on physical geology but generally at the optional level. Whether such a restricted view of geomorphology is healthy for the discipline is a matter of debate particularly when the coverage of atmosphere is broader. Atmosphere is the least popular field for candidates although it still gains entry to all syllabuses because of academic pressure rather than consumer demand. The emerging core here focuses on processes in the atmosphere and their climatic consequences in a varying selection of regions. Charts (no longer produced in Britain) and satellite images are also key aids to interpretation. In the case of ecosystems, which has increased in popular appeal to become the new physical geography, the basis processes of the system and the associated soil system together with the management of systems at varying scales appear in all the submissions. The human interface is stressed in one way or another, even by those syllabuses which only focus upon geography.

Population geography has focused upon the changing structure and migration with the relationship between population and resources being less central. Resources do seem to have been relegated to the level of an interesting digression other than in 16-19 where Energy is a core topic. In economic geography there is a tendency for the focus to be on industrial geography with agriculture becoming slightly peripheral. Nevertheless it is possible to detect an increased attention to the tertiary sector and communications but not transport. Finally, settlement studies are primarily urban with a very strong emphasis on the problems or urbanisation at all scales and in a variety of places.

This cursory analysis does draw several points to our attention. First, the move to cut the size of 16-18 syllabuses to fit A S has resulted in a retreat into the familiar rather than a reassessment of the core for the nineties. Even the most progressive, 16-19 Project, has actually acted in a conservative manner and changed little. Disciplinary conservatism has retained atmosphere and seen the inclusion of many outdated models and concepts which are safe to teach and examine. Secondly, if we are looking for an explanation for our conservatism, then the haste with which syllabuses have been compiled in an age of far reaching educational change throughout the system is one obvious factor. However, it is possible to suggest that the conservative response is precisely what was envisaged by the government when it began the process. While values and attitudes had begun to feature at A level and in the A S, the scope for values based teaching diminishes if we retreat to the core of post quantitative revolution geography. The present government is hardly one to favour teaching which examines the consequences of its actions. Such curriculum developments and the hasty reaction of syllabus developers enable government to constrain initiative without the need to enforce a retreat from the enlightened teaching and assessment of values and attitudes.

It would be unfortunate if a revised A level structure was to result in a more outdated approach to knowledge. So it is to be hoped that the hurried response which has been the subject of this paper will be a first attempt to find a core. Having retained some of the notable advances in assessment, such as assessing values and attitudes, field study, structured and data response questions and the introduction of criteria banding for the assessment of essay work, it would be a shame for the content not to undergo the same rigorous reassessment as the method of teaching and examination. We need to ask what content will continue to be relevant for the next decade to produce a good geographical education. The new core does appear to be a defensive reaction to political pressure when it should be the opportunity to develop a more tightly focused and relevant subject designed to education people.

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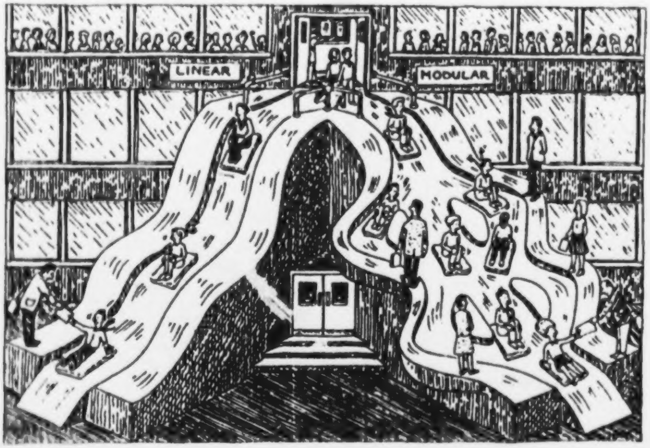
THE EXPERIENCE OF RECENT GEOGRAPHY CURRICULUM DEVELOPMENT IN ENGLAND AND AUSTRALIA : A STUDY IN CONTRASTING APPROACHES

Stephen Codrington

Abstract:
Recent development of the new H.S.C. geography syllabus in New South Wales (Australia) is compared with similar recent developments in G.C.S.E. geography in England. The constraints on syllabus development, processes undertaken, content priorities and implementation are contrasted. The paper concludes that both new curricula represent advances over earlier syllabuses, although the G.C.S.E. courses are more constrained by tradition than the Australian example.

INTRODUCTION



(courtesy The Independent)

Linear or modular, thematic or regional, nationalistic or global, systems-process or contemporary issues-oriented: these and literally thousands of other decisions are made by curriculum planners when devising new geography courses for use in schools. But, as the cartoon above suggests, do such decisions simply represent alternate ways of sliding down the slippery dip of education?

New geography curricula are being devised constantly around the world in attempts to remedy real or perceived failings in pre-existing syllabuses. Two recent attempts at geography curriculum development, one English and the other Australian, have been almost revolutionary in the extent to which they have promoted new methodologies, perspectives and content in their respective educational environments. The radical nature of these curriculum developments demands attention from curriculum planners and geography teachers elsewhere, who will naturally wish to ascertain whether these new developments represent important landmarks or incidental tangents. The focus of this paper, therefore, is an examination of the contrasting approaches, relative merits and overall successes of these two curricula.

The English curriculum process to be examined is the development of new syllabuses by six examining boards to satisfy the requirements of the General Certificate of Secondary Education (G.C.S.E.). Teaching of these syllabuses commenced in September 1986 for initial external examination in July 1988. The Australian example is the New South Wales Higher School Certificate (H.S.C.) geography syllabus, initial teaching of which commenced in February 1988 for initial external examination in November 1989.

Research for this paper has been conducted at the theoretical and practical levels for several years. I was a member of the syllabus committee which devised the New South Wales H.S.C. geography syllabus from 1979 to 1987. Interviews were conducted with several members of equivalent G.C.S.E. committees in England during my year's exchange teaching in England in 1987. Following the year's exchange teaching, I am one of the few people to have taught both the new H.S.C. and G.C.S.E. geography curricula in schools.

ORGANIZATION OF CURRICULUM DEVELOPMENT

The structures through which the two geography curricula were developed reflected the overall educational environments of the two countries. In England, the responsibility of syllabus development is diversified. Six examining boards develop syllabuses and set examinations on them. Although the names of these boards (London and East Anglian Group, Midland Examining Group, Northern Examining Association, Southern Examining Group, Welsh Joint Examination Committee and Northern Ireland Schools Examinations Council) suggest geographical limits of responsibility, their areas in fact tend to be little more than "spheres of stronger influence". As a simple example of this, some schools in Lancashire (northwest England) in 1987 were teaching Southern and Midland courses, although the majority were presenting one of the six "local" Northern courses. Each board is a private company aiming to maximise its share of the overall market of selling examination papers. Therefore, each board has produced several G.C.S.E. syllabuses in an attempt to cover the market, and there are some 26 different G.C.S.E. syllabuses from which schools can choose. Although there is some variation between boards, a typical geography syllabus committee would consist of five or six members.

In New South Wales, all syllabuses are issued through a government statutory body, the Board of Secondary Education. The Board delegates the task of curriculum development to a syllabus committee in each subject. Each syllabus committee comprises 24 members, of whom 14 are teachers.

INITIATIVES FOR A NEW SYLLABUS

In England, the new G.C.S.E. syllabuses were responses to government initiative. The British government, through the Secondary Examinations Council (S.E.C.), wished to restructure English secondary education, and in anticipation of this restructuring, several boards began developing new syllabuses as early as 1980. In January 1985, the S.E.C. issued the "National Criteria" for G.C.S.E. Geography, identifying common features to which all new syllabuses must conform. The principal points of this were a content emphasis on the geography of the British Isles within its European and global context, an identification of the approximate evaluation weightings for factual recall and skills, and several guidelines regarding assessment.

The initiative in Australia for a new syllabus came through the syllabus committee itself as a reflection of growing teacher dissatisfaction with the existing "outdated" systems analysis of the existing syllabus, which had been taught with various modifications since 1965. Approval was granted to develop a new syllabus in early 1983.

PROCESS OF SYLLABUS DEVELOPMENT

It is difficult to generalise about the process of G.C.S.E. syllabus development because of the large number of syllabus committees developing curricula. However, we can use the Midlands Examining Group (M.E.G.), based in Nottingham, to exemplify some common aspects. At a very early stage in the discussions, M.E.G.'s geography syllabus committee agreed to develop two separate syllabuses to maximise market share. Work commenced on the "mainstream" syllabus immediately, and this later became Midlands Geography Syllabus A. The second syllabus (the "minority" syllabus) eventually became two alternative syllabuses: Midlands Geography Syllabus D (a free syllabus allowing for in-school curriculum development based upon the Bristol Project) and Midlands Geography Syllabus E (essentially social geography based on the Avery Hill project).

M.E.G. sent a draft syllabus and questionnaire to schools in 1983. The responses to the questionnaire strongly supported the (new) concept of a common examination paper for all ability levels and greater emphasis on compulsory fieldwork. Syllabus aims and assessment procedures were determined quite early, and development of course content was the last step. Due to industrial activity in schools at the time, the British government adopted a "get tough" policy with teachers' unions, and part of this was a government decision to begin G.C.S.E. teaching in September 1986 whether schools claimed to be ready or not. This led to some rush to obtain S.E.C. approval for syllabuses. Several syllabuses were approved despite containing obvious errors, and some syllabuses were approved despite their clear non-compliance with S.E.C.'s own "National Criteria". Furthermore, the teaching of several syllabuses commenced in September 1986 even though those syllabuses had not been approved, presumably with teachers devising programmes on the basis of drafts they had seen. The rushed introduction and the large number of different syllabuses meant that few resources such as textbooks were ready for the introduction of the courses in September 1986. Of six schools in Lancashire which I surveyed in late 1987, not one had yet decided upon textbooks for G.C.S.E. geography.

At the time of writing, Midlands Examining Group had seven G.C.S.E. syllabuses from which schools could choose a course of study in geography. Table 1 summarizes the M.E.G. geography structure.

Table 1. MIDLANDS EXAMINING GROUP GEOGRAPHY SYLLABUSES

SYLL-ABUS	APPR-OVED	EST.NO.OF STUDENTS,1988	DESCRIPTION
A	Dec.1985	28,000	"Mainstream" syllabus, 3 themes- a.People & physical environment b.People & places to live c.People & their needs
B	Jul.1986	12,000	Based on the old University of Cambridge and East Anglia 16+ course focussing on a contrast between W. Africa and E. Anglia
C	Mar.1986	6,500	A modular course based on the Avery Hill philosophy of social geography
D	Mar.1986	28,000	Free in-school curriculum development based on the Bristol Project
E	May 1986	29,000	An authentic Avery Hill social geography
H	Dec.1986	7,000	Officially a mature students' course, based on course C
K	Dec.1986	3,000	Officially a mature students' course, based on course D

M.E.G. Syllabus A was the first G.C.S.E. geography syllabus to be approved by S.E.C., and so captured a large share of the market, even in schools outside the English Midlands.

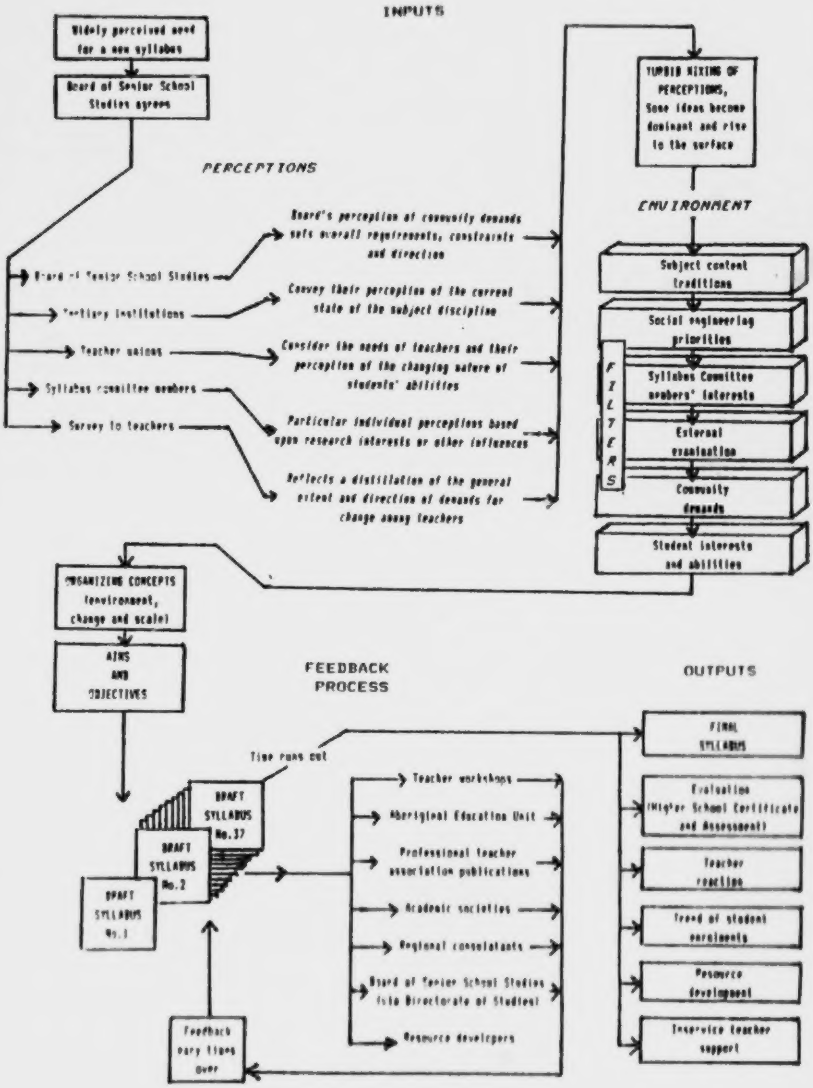
Specimen exam questions were distributed several months after the syllabus, and in the rush to get these questions to schools, there were several problems, such as too great a degree of specificity in the questions and many questions of an inappropriate standard. After S.E.C. made other late changes to their criteria (such as changing the evaluation percentage weightings), M.E.G. issued another set of questions in February 1987.

Figure 1 summarizes the somewhat more complex process of syllabus development adopted in New South Wales. The development the H.S.C. Geography syllabus in New South Wales was more prolonged than G.C.S.E. because a greater level of consultation was undertaken. First, the larger syllabus committee (24 in New South Wales compared with 5 or 6 in England) had a more diverse range of initial input from its members, included among whom were teachers (from Government, Catholic and Independent schools), university lecturers and other tertiary representatives, school inspectors and public servants. Some of these members had dual roles or interests, including members of professional organizations, members of teaching unions and textbook writers.

Further input was obtained through a survey which was sent to all geography teachers in New South Wales in April 1983. Some 506 responses were received, revealing a strong desire among teachers for a new syllabus, probably with a modular structure, and expressing a strong desire that content include themes such as Australia (in its world context), environmental studies and contemporary social issues. Subject to certain constraints, such as an external examination and government policies on multi-culturalism, non-sexism and Aboriginal education, a draft syllabus was developed focussing on the three concepts of environment, change and scale. The concept of 'environment' adopted is particularly noteworthy, as it has become a word with different meanings to different geographers. As perceived by the syllabus committee, 'environment' meant 'total surroundings', including both biophysical components of the environment and people together with their economic, social, cultural and political systems. Finally, a compulsory individual field research project was incorporated into the syllabus, a feature also found in most of the new G.C.S.E. syllabuses.

Many drafts of the proposed new syllabus were developed and taken to teacher workshops and interested committees and organizations to obtain feedback. Feedback thus obtained was incorporated into later drafts, and so the process continued for almost three years from early 1984 to late 1986. An interesting aspect of this process was that copies of draft syllabuses were freely sent to potential publishers of new geography textbooks for the course. This was to ensure that no publisher received a commercial advantage over another publisher, and to encourage as wide a range of

Figure 1. PROCESS OF H.S.C. GEOGRAPHY SYLLABUS DEVELOPMENT


INPUTS
Widely perceived need for a new syllabus
Board of Senior School Studies agrees
PERCEPTIONS
Board of Senior School Studies
Tertiary institutions
Teacher unions
Syllabus committee members
Survey to teachers
Board's perception of community demands sets overall requirements, constraints and direction
Convey their perception of the current state of the subject discipline
Consider the needs of teachers and their perception of the changing nature of students' abilities
Particular individual perceptions based upon research interests or other influences
Reflects a distillation of the general extent and direction of demands for change among teachers
TURBID MIXING OF PERCEPTIONS, Some ideas become dominant and rise to the surface
ENVIRONMENT
FILTERS
Subject content traditions
Social engineering priorities
Syllabus Committee members' interests
External examination
Community demands
Student interests and abilities
ORGANIZING CONCEPTS (environment, change and scale)
AIMS AND OBJECTIVES
FEEDBACK PROCESS
OUTPUTS
Time runs out
DRAFT SYLLABUS No.37
DRAFT SYLLABUS No.2
DRAFT SYLLABUS No.1
Feedback many times over
Teacher workshops
Aboriginal Education Unit
Professional teacher association publications
Academic societies
Regional consultants
Board of Senior School Studies (via Directorate of Studies)
Resource developers
FINAL SYLLABUS
Evaluation (Higher School Certificate and Assessment)
Teacher reaction
Trend of student enrolments
Resource development
Inservice teacher support

(after Codrington, 1987)

new text and resource material as possible for the introduction of the syllabus.

In early 1987 a "final" draft of the syllabus was sent to the Board for approval. After some further modifications at the Board's request, the syllabus was approved in July 1987 and distributed to schools with a full set of sample exam questions in November 1987. Although it was normal Board policy to give schools at least 12 months notice of any new syllabus prior to its implementation, it announced that teaching of the new syllabus would commence in February 1988. It justified this early implementation largely on the grounds that most teachers would have been familiar with earlier drafts of the syllabus they had seen during the "feedback" period of 1984-1986.

COMPARISON OF CONTENT

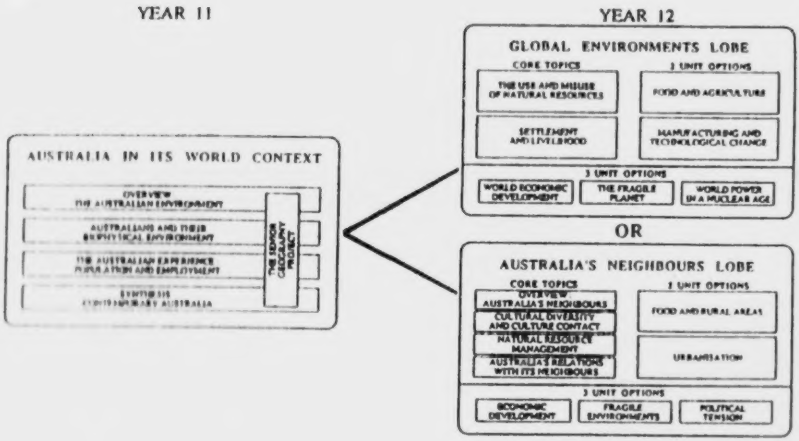
Aside from their different countries of origin, one would expect different approaches to content design in G.C.S.E. and H.S.C. geography. To a large extent, the differences in content derive from the process of syllabus design undertaken. In England, guidelines for student assessment and evaluation were devised early in the process of curriculum development, and content was considered within these limitations (the exam 'tail' wagging the content 'dog'). In New South Wales, on the other hand, with the single constraint that there would probably be an external examination, content was devised on its own merits, and the examination/evaluation structures were designed to facilitate this content.

It is impossible to generalise about the content of G.C.S.E. geography courses due to the huge variation of approaches taken in different courses. In one recent article , Robinson (1987, 208) comments "In some ways G.C.S.E. geography represents a triumph for the late 1950's fieldwork lobby and the late 1960's scientific approach." Perhaps the overwhelming impression of the G.C.S.E. geography syllabuses is their Eurocentrism, or more specifically, their emphasis on the geography of Britain. To some extent, this is a consequence of the emphasis on field research in most G.C.S.E. syllabuses, and as Robinson once again comments "geography in G.C.S.E. has therefore emerged as a narrow parochial study presenting an incredibly inflated impression of the U.K.'s importance in the world (and)... a situation that is truly disastrous for global education" (Robinson, 1987, 208-9).

The new H.S.C. geography course is also somewhat nation-centred, although not to the same degree as most G.C.S.E. syllabuses. H.S.C. geography is taught for two years, and for the first year the focus of study is "Australia in its World Context". The second year of study, which incidentally provides the basis of the bulk of the external examination, comprises a choice between either

"Global Environments" or "Australia's Neighbours", the latter representing a thematic study of the Asia-Pacific zone. Each theme in the course is treated holistically with reference to contemporary events and changes which are occurring, and referring to examples of varying scales, including the global scale. Figure 2 summarizes the content of H.S.C. geography.

Figure 2. COURSE STRUCTURE, H.S.C. GEOGRAPHY


YEAR 11
AUSTRALIA IN ITS WORLD CONTEXT
OVERVIEW THE AUSTRALIAN ENVIRONMENT
AUSTRALIANS AND THEIR BIOPHYSICAL ENVIRONMENT
THE AUSTRALIAN EXPERIENCE POPULATION AND EMPLOYMENT
SYNTHESIS CONTEMPORARY AUSTRALIA
THE SENIOR GEOGRAPHY PROJECT
YEAR 12
GLOBAL ENVIRONMENTS LOBE
CORE TOPICS
THE USE AND MISUSE OF NATURAL RESOURCES
SETTLEMENT AND LIVELIHOOD
2 UNIT OPTIONS
FOOD AND AGRICULTURE
MANUFACTURING AND TECHNOLOGICAL CHANGE
3 UNIT OPTIONS
WORLD ECONOMIC DEVELOPMENT
THE FRAGILE PLANET
WORLD POWER IN A NUCLEAR AGE
OR
AUSTRALIA'S NEIGHBOURS LOBE
CORE TOPICS
OVERVIEW AUSTRALIA'S NEIGHBOURS
CULTURAL DIVERSITY AND CULTURE CONTACT
NATURAL RESOURCE MANAGEMENT
AUSTRALIA'S RELATIONS WITH ITS NEIGHBOURS
2 UNIT OPTIONS
FOOD AND RURAL AREAS
URBANISATION
3 UNIT OPTIONS
ECONOMIC DEVELOPMENT
FRAGILE ENVIRONMENTS
POLITICAL TENSION

(Board of Secondary Education, 1987, 6-7)

Although approaches vary among G.C.S.E geography syllabuses, most recognise the division between physical and human geography, and ensure that some balance is maintained between the two. On the other hand, H.S.C. geography contends that one of the distinctive contributions geography can make to learning is its integration of the physical and human aspects of environments. Thus, H.S.C. geography contains no purely physical and human topics, but the entire course attempts to study aspects of the total environment in an holistic manner. Links between the human and biophysical aspects of the environment are treated in every theme of the course, from total catchment management through fragile environments to food and agriculture, economic development and even world power in a nuclear age.

DISCUSSION

From the above, several interesting points of comparison can be made. Both G.C.S.E. and H.S.C. geography courses reflect some similarities in their framers' perceptions of the direction in which geography is heading. Compared with the courses they replaced, both courses were more humanistic, placing greater emphasis on contemporary issues of human concern and less on "traditional" regional analyses. Both courses place great importance on fieldwork and on the communication of values through geography.

Differences are also apparent, however. The English courses are more "traditional" with their greater emphasis on process-oriented physical geography, compared with the wider, perhaps more sociological, view of the nature of geography taken in the Australian course. Of course, many approaches are possible within the G.C.S.E. framework- it is simply a matter of which syllabus a school selects. In devising the new H.S.C. geography syllabus, the syllabus committee recognized that it would not be possible to cover the entire sphere of geography in a two year course, and so deliberate choices were made on the basis of those aspects of geography which had most to offer the adolescent student of the 1990s. Having made the selection, it was felt that the content selected should be part of the experience of every geography student. Thus, the option in the G.C.S.E. geography framework to adopt more esoteric or traditional approaches was deliberately not made available in New South Wales H.S.C. geography.

In developing the new H.S.C. geography syllabus in New South Wales, an "open" policy was adopted where feedback was sought from a wide variety of sources. In contrast, G.S.C.E. development was largely done by small committees, with little outside consultation, and under great contraints of time imposed by the government. As a consequence of the "open" approach adopted in New South Wales, some twelve textbooks were being prepared to satisfy the first year (Year 11) of the new H.S.C. course by early 1987, although only three were actually published by the beginning of course implementation. By contrast, many schools in England today are still not using any textbooks for their G.C.S.E. geography. For some schools, this is because they feel that textbooks are inappropriate to the philosophy of G.C.S.E. geography. For many schools, however, the absence of suitable textbooks is the principal (and frustrating) factor. Because of the large number of courses available, new books tend to be written with an eye to addressing several syllabuses, with the effect that many teachers see books as being insufficiently specific on their course or containing a distorted balance of content.

CONCLUSIONS

Compared with many secondary geography courses around the world, both H.S.C. and G.C.S.E. geography have some justification in claiming to be "landmarks" in secondary geography curricula. They have taken the study of contemporary geographical issues out of the tertiary institutions and the more "radical" teaching journals and placed them firmly before teenage students in the classroom.

Nonetheless, both curricula have suffered from problems in their design process, and it is interesting to note that no G.C.S.E. or H.S.C. syllabus committee developed their syllabus following a theoretical model of curriculum development. Both G.S.C.E. and H.S.C. geography courses could be accused of parochialism, although the accusation would be stronger in the case of the former than the latter.

In 1987-88, there was some debate in the United Kingdom over the relative merits of introducing a national curriculum in each subject. Such a move would remove the present freedom to select less worthwhile or outdated courses, although the proposal has drawn much criticism from some quarters. One can well imagine the attitudes, interests and commercial motives of today's six examining boards in seeking to preserve the status quo! The Australian model of offering one single "best" curriculum must have considerable educational appeal.

Any teaching course at the secondary level is subject to many constraints from outside interests: government policies, external examinations, community expectations, perception of student abilities and interests, the whims of syllabus committee members and the traditions of the subject discipline. Given these constraints, it is fair to say that both H.S.C. and G.C.S.E. geography curricula represent more contemporary visions of geography than those found in many other parts of the world, and are thus worthy subjects for further investigation by geographical educators.

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GEOGRAPHY IN THE BRITISH EDUCATION SYSTEM

Ralph Hebden

ABSTRACT

In the post-industrial society, the social services are well established but complex and expensive. This leads to competition between the services for central government resources and an important justification for resources in education may become vocational relevance. The educational health of a subject may also depend upon its ability to permeate the whole complex system. Geography faces this situation in Britain today and to survive must initiate curriculum development which is both vocational and makes a contribution throughout the education system.

INTRODUCTION

A characteristic of the post-industrial society is a concern to provide social and caring services. Unfortunately these services can always be improved upon and so make increasing demands for resources. The point comes when priorities as between competing services have to be made by central government. Education in Britain in the late 1980s is in this position. Further, there is competition within education for the resources that are available from central government. A result is that all parts of the education system are being asked to justify their spending, including geography. In curriculum terms Geography has to justify its existence compared with English, Biology or Music, for example at all levels of the education system. Nobody has previously pressed for a justification of curriculum content. The criteria now being applied by central government are about social relevance and preparation for the world of work (DES, 1985).

This paper is grounded in this socio-political framework for education (Lewis, 1982). For several years a few geographers in both America and Britain have tried to stimulate research into the image of geography (Haigh, 1982; Hebden, 1984; Dawson, Hebden, 1984). In December 1986 a seminar on Geography in the Education System (in Britain) was held in London (Various, 1986). The results clearly indicated that on the whole geography was in an exposed position.

In Britain, geography has no single subject organisation. The Geographical Association, the Institute of British Geographers and the Royal Geographical Society, with the Scottish Association of Geography Teachers and the Scottish Geographical Society, present a complex situation. Although there is a National Committee for Geography within the Royal Society, it has been virtually ineffective for many years. This does not make action to promote geography easy (Lewis, 1982).

Against this background this paper argues the urgent need for an overview of geography within the education system in Britain.

ENGLISH EDUCATION SYSTEM

For accuracy, the present description is limited to the English state system but the situation in terms of structure and socio-political pressures are the same throughout Britain. Compulsory schooling starts at 5 years of age and the primary curriculum continues till 11 or 12. The curriculum is open in its approach with much emphasis upon learning experiences rather than discipline content (DES, 1986). The secondary stage has a clearer subject based curriculum leading to examinations at 16 years of age. Compulsory education then ends. The tertiary stage is in a state of change. Students may stay in their secondary school for a one or 2 year academic biased course, may move to a sixth form college for the same type of course or go to a further education college with a technical bias to the curriculum. Very recently tertiary colleges have been formed which combine the academic and technical curriculum opportunities of the other institutions mentioned already. This wide range of choice results from recent curriculum changes in the system (SCUE, 1987).

In advanced education students have a choice at degree level between the traditionally academic universities, the more recently created vocationally biased polytechnics and colleges of higher education. The further education colleges offer a wide range of vocational courses below degree level.

There is now an increasing provision for mature students. Essentially this is part-time adult education and it includes; very general or highly vocational courses through the further education colleges; home study through the Open College; part-time study at a Polytechnic for a professional qualification or the Open University home based study for a degree. Access courses to prepare for re-entry into education, distance learning courses where the bulk of the study is at home or work and open learning courses where the student studies at home at their own pace are now all possible. The recent radical changes in both the tertiary stage and the adult education stage are part of the current challenge to geography.

THE POLITICS OF EDUCATION

The education system was founded on the dual principle of learning for its own sake or learning skills for vocational use. In the 1980s in Britain under a Conservative government the emphasis is upon skills for vocational use. This has been realised through assessment requirements and curriculum development. Before the 1980s the

British assessment system was simple with Ordinary level at 16 years, Advanced level at 18 years, Degree at 21 years and a variety of vocational qualifications studied on a part-time basis, essentially while at work. The emphasis on training has resulted in general unification through the formation of the Business and Technician Education Council (BTEC) with assessment at the same level as Ordinary and Advanced levels. The basic commercial skills training associated with the Royal Society of Arts (RSA) and City and Guilds of London Institute examinations are now taught in the full-time school system alongside BTEC courses (SCUE, 1987). Curriculum projects within schools for 14 to 18 year olds have focussed upon the Certificate of Pre-Vocational Education (CPVE) and the Technical and Vocational Education Initiative (TVEI) in the 1980s. As their names indicate, both projects have a clear emphasis upon vocational training of secondary school students. The new Advanced Supplementary (AS) level is a further attempt to reduce academic specialisation in secondary schools.

This political pressure to emphasise training has spread into further, higher and adult education in Britain. The government has encouraged more part-time and short course provision within the post 18 education system by providing additional funding through the Professional, Industrial and Commercial

Updating (PICKUP) programme. Distance learning and open learning packages are being initiated for people in full-time work. The Open College has been established to provide a central unit to encourage these developments within adult education. The overall picture is of government pressure for change, to produce a more highly trained labour force.

THE GEOGRAPHICAL RESPONSE

If geography is to retain a secure place in the education system in Britain it must respond to this change process. Geography was well established in the 'old' system in the 1970s with three secondary school curriculum projects in geography adding to the popularity of the subject amongst students by updating the geographical curriculum and assessment method (Boardman, 1985). What follows is a rapid and simplified survey of the current situation indicating the response of geographers to current changes.

The primary school system has never taught geography explicitly. Rather geographical content and skills have occurred under umbrella titles such as environmental, local or social studies, or in projects. This situation is being sustained.
In the secondary school, geography teachers have responded to GCSE changes and have been involved with TVEI. CPVE has not been so attractive to

geographers though the AS level should prove to be a strength for geography. BTEC courses have generally been ignored by geographers, though there are a number of potential areas for geographers. City and Guilds along with RSA courses have virtually no geographical potential. As a result, the new areas in the curriculum associated with CPVE, BTEC, RSA and City and Guilds pose a potential threat by reducing both the time available to geography and the number of students.

In Britain the number of 18 year olds is decreasing each year into the 1990s. This reduces the potential geography higher education student numbers in total, even if geography continues to attract the same proportion of the students available. With the pressures on secondary school geography already identified, this proportion is likely to fall, as the statistics in Figure 1 indicate. If geography is to avoid contraction in higher education it must attract more mature students (Hancock, 1986). The current evidence is that geography does not do this (Various, 1986).

Year	Eng	Bio	Geog	Year	Eng	Bio	Geog
1976	35.91	19.75	22.72	1981	33.57	22.86	20.36
1977	36.13	20.58	22.42	1982	35.33	23.76	21.34
1978	35.23	20.98	21.12	1983	36.44	24.18	22.24
1979	33.33	21.50	20.26	1984	35.39	23.77	21.91
1980	34.04	22.05	19.73	1985	33.95	23.38	21.02

Figure 1 Advanced Level School Results, 1976-85; selected subjects in thousands

In adult and further education, geography rarely appears as a subject, though there are courses with a geographical input. But geography is not seen as vocational and so a necessary subject for career enhancement; nor is it seen as a hobby or interest subject which people do for fun.

DISCUSSION

Vocational training is about learning specific skills which are relevant to the world of work. Geographical skills involve literacy, numeracy and graphicacy which are all relevant (Hebden, 1983). Further, certain aspects of geography do relate directly to the world of work. Resource location, international trade, industrial location, transport networks and retailing systems are but a few examples. The TVEI geography project clearly demonstrates the way geography can respond to the socio-political demands now made upon the education system. The problem is not geography but geographers, as demonstrated by the Geographical Association when it responded to the challenge present by the government to secondary school geography in 1985 (Hall, 1987).

In the 1970s a group of educational researchers monitored the development of the Geography for the Young School Leaver project in South Yorkshire (Hebden, 1977). They showed that curriculum development is an ongoing process and proposed a model of continuous curriculum evolution which meant that geographers should always be prepared to meet the challenge of new curriculum initiatives. Failure to do so could be death to geography. any

CONCLUSIONS

There are four lines of action open to British geographers to sustain the subject. At secondary and further education levels they should become involved in BTEC courses. Land use studies and leisure studies are two BTEC areas where a geographical input is possible. At the higher education level there is the need for a curriculum development project to identify good relevant practice. Within adult education, geographers need to offer general interest courses to improve the image of the subject with the general public, to develop continuing education courses to demonstrate the vocational relevance of the subject and initiate access courses to increase mature student entry into higher education. Finally, geographers must develop learning packages for distance and open learning courses. These will become increasingly important methods of teaching subjects and geography needs to grasp the opportunities currently available at this early stage of this particular development.

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EDUCATIONAL SYSTEM OF GEOGRAPHY IN THE BULGARIAN SCHOOLS

Dimitar Kanchev

Abstract

Geographical education can be looked upon as a system whose main components are: the content of the subject, the teaching methods and curricula. This paper aims at revealing the geographical features of the aforesaid components and their relationship. On the basis of the research, carried out, we have concluded that: the methods of geography teaching are neither purely educational nor geographical but they are bordering on geography and pedagogics, thus shaping a transitional scientific field, called "didactics of geography"; the content of the subject has to be selected in such a way as to give socially important knowledge of geography and its related sciences; in spite of the introduction of modern tecnique in teaching, the direct observations on nature and economy and the practical classes with a map have always been and remain the principal methods; among the various forms of teaching it is the lectures, the seminars and the excursions that are preferred. The methods and pattern of education depend on the content of the subject and the three of them in combination are determined by the demands of society.

Introduction

By developing the didactics of geography as a transitional science on the boundary between geography and pedagogics it will be possible to solve some methodical problems concerning the specific nature of geographical training. The investigations in this field are actively supported by distinguished geographers - specialists and researchers, and by teachers and lecturers.

Main text

There are more than 2500 sciences in the world. One of them is the didactics of geography. In the official nomenclature of sciences in Bulgaria it falls under the system of educational sciences. In fact it occupies a border-line position between geography and pedagogics (Fig.1) as is the case with medical geography (on the border-line between geography and medicine), with toponymy (on the border-line between history and linguistics), etc. That the didactics of geography is intermediate in its essence is confirmed by the qualification of the specialists working in this sphere - they are geographers, specializing additionally in teaching. The didactics of geography acquires greater importance for the improvement of geographical education and it can successfully carry out the tasks posed to it, if it develops as an independent science whose aim is to identify and find solution to numerous specific methodical problems.

An ultimate goal of geography teaching is to contribute to a better learning content in terms of its structure, principles of generalization and conformity with the latest scientific achievements

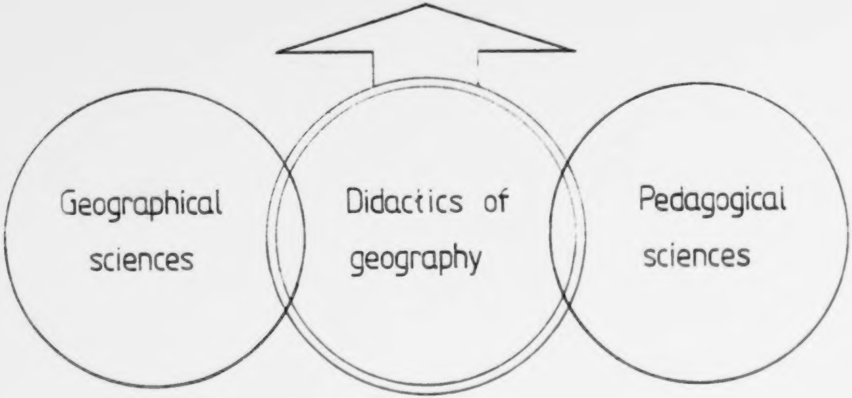
Geographical sciences
Didactics of geography
Pedagogical sciences

Fig.1. Didactics of Geography - a border-line science

as well as with the age of the pupils.

Geography began to be studied as a subject in the Bulgarian schools in 1835, or it has a history of 150 years. The course of school geography is structured as follows:

4th form - Native land studies /2 hours a week/
5th form - General studies on physical geography. Geography of the continents of Africa, South America and North America /2 hours a week/
6th form - Geography of Europe (including detailed studies of the Balkan Peninsula and Bulgaria), of Asia, Australia with Oceania and Antarctic /2 hours a week/
7th form - General physical geography/2 hours a week/
8th form - Socio-economic geography of the world /2 hours a week/
9th form /2 hours a week/, 10th form /1 hour a week/ - Geography of Bulgaria (nature, population, economy, towns).

The course of NATIVE LAND STUDIES in the 5th form serves as a basis for gaining further systematic knowledge of history and geography. The main reason to begin the course GEOGRAPHY OF THE CONTINENTS with Africa should be associated with the fact that this is the continent where the natural regularities (changes of natural components and whole complexes from north to south) are best illustrated. The course GENERAL PHYSICAL GEOGRAPHY supplements the regional courses on GEOGRAPHY OF THE CONTINENTS. It helps reveal common geographical regularities, formulate geographical notions and get an idea about some global problems, for instance the ecological one. The course SOCIO-ECONOMIC GEOGRAPHY OF THE WORLD aims to give an objective science-based description of the contemporary world. The course GEOGRAPHY OF BULGARIA is read to the pupils from 9th and 10th form. It consists of two parts: PHYSICAL and ECONOMIC GEOGRAPHY which are taught in mutual relation.

Geographical education is compulsory for all pupils in our secondary schools. In addition geography is included as an optional subject in forms from 8th to 12th, being studied twice a week. Involved with it are those students who take a keen interest in geography or generally speaking in the earth sciences and economy. Particular attention is paid to the native land studies.

The system of geography teaching methods embraces about 20 methods, integrated into 3 large groups: oral, visual and practical methods oriented on gaining geographical knowledge and developing labour skills; testing procedures and assessment (oral and written examinations and checking up of practical abilities); methods encouraging pupils' imagination and creativity (discussion, consultation, educational games, etc.). There is a trend towards increasing the relative share of the last group of methods. Of all modern audio-visual aids computers are most largely used in geography teaching. Now the computers available in our schools are enough to meet the needs but it is the soft wear that is inadequate and of low quality.

Geography lesson is considered to be the basic unit in the organisation of the teaching process. Prevalent are those lessons,containing new information, which broaden the outlook and improve the knowledge but together with them practical classes and revisions of the material are also widely practiced. Comparatively new methods of teaching are the seminars and lectures. They dominate the free optional education. Recently emphasis has been put on the individual and small-group activities.

Discussions

Nowadays the necessity to provide pupils with general geographical knowledge is strongly felt. However, our schools cannot respond to it and extend the study of geography because many other subjects are to be taught, each one represented with a considerable number of hours in the curricula. According to us the secondary schools in Bulgaria do not aim to produce specialists - mathematicians, physicists, chemists, biologists, historians, linguists, geographers, etc. They are preoccupied with developing practical skills and theoretical awareness over a broad range of topics in the respective scientific field, useful for all pupils, no matter of their future profession. Therefore, all school subjects, geography included, should be compulsory to the top forms in the secondary schools and have an equal status in the curricula.

The educational process is to be organised in such a way as to enlarge knowledge, to develop pupils' intellectual abilities, to contribute to the formation of their character and good work habits, to arouse their interest in geography and to teach them to love and safeguard peace.

Schools have been competing with mass media in the recent years. Schools by no means can allow themselves to lag behind. Taking into account all other requirements they must insist on better and more interesting textbooks and on a better structuring of educational process.

Conclusions

By observing the aforesaid principles geography teaching becomes more effective. It makes pupils active and decisively turns the educational process into a creative activity. As a result of our investigations some findings and recommendations of principal importance can be mentioned:

- geography courses to be most favourably distributed which is possible if geography as a subject would be taught from 5th to 10th form twice a week;
- the content of the subject has to be changed by including additional material dealing with important global problems, which are elucidated from geographical viewpoint. Attempts should be

made to provide a better insight into the problems of ecology, to educate the young people in rational approach to nature and to convince them that living in peace is the only way toward progress;

- the traditional methods of geography teaching must be further improved and together with them new ones to be employed.

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THE TREATMENT OF THE PACIFIC REGION IN PRESENT-DAY GERMAN SECONDARY SCHOOLS

Reimar Pertsch

Abstract: After restricting the term "Pacific Region" to Australia, New Zealand and Oceania and giving a general survey of the education system in the Federal Republic of Germany, secondary school geography curricula of the various federal states ("Länder") are discussed. The study reveals that only very few Länder require the Pacific Region to be dealt with. The curricula of the various states give only a broad outline of the topics and objectives; this allows for suggestions on how and where to include phenomena of the Pacific Region. Such suggestions are offered as teaching aids.

The aim of the following report is to examine the significance of the Pacific Region (P.R.) in geography teaching in the schools of the Federal Republic of Germany (FRG). With this in mind the main part of the report will comprise the present situation in the different federal states of Germany with the prescribed curricula as guidelines. Due to lack of space and time I have to refrain from discussing the P.R. in German textbooks and atlases for the time being; textbooks can be viewed by interested colleagues during the meeting. Suggestions for further teaching units on the P.R.

will conclude the report.

First of all two terms have to be clarified.

Without taking a critical look at the varied literature on the term "P.R.", for the purposes of this report the P.R. encompasses Australia, New Zealand and Oceania (South Pacific Islands), i.e. roughly the area comprised by the South Pacific Forum.

Addressing an international committee, the term "German Secondary Schools" needs brief clarification. Germany has always consisted of autonomous states, called "Länder". The importance of the Länder in this federal structure is reflected by the fact that traditionally the Länder are responsible for education. To ensure a certain amount of coordination of curricula and standardization of graduation levels, i.e. to stem cultural polycentrism, the Standing Conference of the Ministers of Education was created as a clearing house.

Compulsory schooling begins at the age of 6 and lasts till the age of 15 or 16. All young people up to the age of 18 must attend at least a part-time vocational school (dual system). As the figure illustrates, after finishing primary school at 10 children can attend any of the three types of secondary schools "Hauptschule", "Realschule", "Gymnasium" or, in some Länder, "Gesamtschule". The Gymnasium-- I am going to base my report on this type of school-- attended by nearly 30% of all children, comprises grades 5 to 13 and leads to "Abitur", which is a prerequisite for university entrance. Up to grade 11 there are no electives; a limited amount of choice is permitted in the last two grades.

The grades for which geography is compulsory, mostly as a separate subject, differ according to the federal states. Geography is taught in Gymnasium from grade 5 to grade 8 at least, sometimes through to grade 10 and partly as an elective in the upper grades 11 to 13. Geography is allocated at least two lessons per week.

In the subsequent paragraphs I would like to draw your attention to the geography (geo) curricula (cur) of the various federal states; these cur have been set up by committees consisting of teachers and state officials according to certain basic criteria. Up to the sixties the cur and in accordance with these the textbooks were based on "Länderkunde", i.e. countries were studied successively in detail. In contrast to former Länderkunde most modern cur contain topics of systematic geography with spatial examples taken from regional geo. As a preamble to most geo cur for all grades of Gymnasien in the FRG certain common basic aims are stated; among these are "acquiring of topographical knowledge", "gaining of an understanding of world distibution patterns", "integral comprehension of regions and their characteristics, recognising interaction between natural and man-made geo factors", "relations man-environment".

Spatial concepts have to be taught in problem-orientated lessons; regions are to be characterized as unique on the one hand, on the other hand however, general insight has to be gained which also allows transfer of knowledge gained. The T.S., particularly Australia with its variety of geo phenomena, lends itself to the experience of such insight.

First cur, in which Australia, New Zealand or Oceania are prescribed explicitly will be dealt with. To begin with, extracts from the geo cur for the city state of Bremen are presented.

Grade 7 Heading "Interrelations of different type of areas"-"Australian ore for the blast furnaces throughout the world"-Industrialized countries and countries rich in natural resources; the case of iron ore.---Objectives: Among the biggest deposits in the world: Northwest Australia; counterbalance to wool production; bulk goods; steel works located at the water.---Skills(behavioural/operational objectives), technical terms, bibliography for the teacher, AV material, teaching methods are listed. (Bremen 1979, 32)

Grade 5 Heading "Water and food supply in arid regions"-Making use of arid regions: sheep raising in Australia". Continuation similar to grade 7 example. (Bremen 1976, 52)

The other German city state, Hamburg, has published its geo cur more recently (1984).

Grade 11 (elective): Australia is only mentioned once under the heading "Developing areas"-"Problems involved in the utilization of arid regions". (Hamburg 1984, 9)

The geo cur of Berlin - a federal city state with a special status -will be examined next.

Grade 9 Heading "Australia"

Objectives: knowledge of the natural and of the man-made divisions of Australia and Oceania and their position in the grid; knowledge of the development and settlement of Australia; knowledge of the deposits of natural resources and of the industrial areas, crops, farming areas and means of transportation; realization of the adjustment of exports to the needs of the world market, interpretation of thematic maps, statistics, diagrams and current reports (skills). (Berlin 1984,12)

The geo cur for grade 9 for the federal state of Schleswig-Holstein suggests the study of Australia twice under different aspects.

Heading: "Industrialized nations"-"Industrialization in different areas and different economic and social systems: Australia" (interalia).

Heading: "Australia"-"Development of a sparsely populated continent"

Objectives:1. spatial/topographical orientation 2. development of the area 3. traditional export-orientated utilization 4. independent development by utilisation of natural resources

Topics:1. location and natural division 2. course of settlement 3. extensive agriculture 4. export of mining products and further development of the

industry
Technical terms: 1. peripheral location, dividing range, "dead interior" 2. aborigines, colony of convicts, Dominion 3. merino sheep 4. country abounding in natural resources (Schleswig-Holstein 1986, 3o)
Northrhine-Westphalia's (Nordrhein-Westfalen) geo cur only mention Australia as a supplementary regional topic to be dealt with in grades 9 or 1o. Heading: "Australia"-"Special factors with emphasis on its early (geological) separation and its special position economically speaking" (Nordrhein Westfalen 1978, 19)
Rhineland-Palatinate's (Rheinland-Pfalz) geo cur contains many cross-sections regarding related subjects and treatment of similar topics at an earlier or later stage in geo. In grade 6 the unit "How man makes use of energy resources" has to be discussed. As a regional example "Exploration of uranium in Australia" is suggested. In connection with this pupils must get to know the topography of Australia. (Rheinland-Pfalz 1978, 5o)
Last not least I will now present the cur of my home state Baden-Württemberg. Besides including an amount of cross-sections similar to the ones of Rhineland-Palatinate, Australia as a required topic is only referred to once in Baden-Württemberg's geo cur, i.e. "New iron ore and raw materials in West Australia" in grade 12. In grade 8 Australia can be chosen as an additional topic. (Baden-Württemberg 1984, 36o)

As for the remaining federal states, the F.R. is either not mentioned at all like in Hesse-- here, as an exception, geography can hardly be regarded as a separate subject-- or the cur were not readily available, like in the case of Bavaria. Concerning Lower Saxony (Niedersachsen) the F.R. is not mentioned explicitly in the cur, the objectives being broad however, suggestions for the inclusion of regional examples from the F.R. will be made as listed below.

For grades 7/8 Lower Saxony prescribes a unit called "Importance of natural conditions for areas and people". As world-wide regional examples are permitted, aridity and its effects in Australia could very well be studied here. "The contrast between New Zealand's east and west coast or "New Zealand's highly-developed agricultural productivity" could also be profitably dealt with here. Another topic for grade 7/8: "Natural limitations imposed on man's economic activity: supply with natural resources and energy"; here again Australia's resources as well as its energy schemes and the relevant problems present a pertinent regional example. By way of contrast the atolls of Oceania as areas with an extreme shortage of resources, water, energy etc would provide an interesting area of study. (Niedersachsen 1982,11)

In Rhineland-Palatinate a grade 8 unit is called: "Developing of areas". Here a study of agriculture in Australia and/or a study of its mineral resources is suitable. (Rheinland-Pfalz 1984, 61)

Northrhine-Westphalia's cur prescribe, in general terms, quite a few topics that can very well be exemplified in the P.R. N.G.
Grade 7/8 "Development and change of importance and value of regions"- "The importance of natural resources for the industrial development of an area"; examples are to be taken from overseas: "Australia's industrial development" (suggestion)
Grade 7/8 "Effect of innovations on agricultural areas"; "Irrigation in Australia" (suggestion) (Nordrhein-Westfalen 1978, 19)
Grade 11 "Arid areas subject to risks with limited economic flexibility"-"How to overcome adverse climatic conditions by irrigation and problems entailed"; "Australia" (suggestion)
Grade 11 "Problems of the utilization of regions bordering on uninhabited areas"; "Atolls in Oceania (suggestion) (Nordrhein-Westfalen 1983, 61/74)
In Berlin in grade 9 "Oceans" must be dealt with, e.g. as suppliers of natural resources and food; in grade 7 "Trenches and island arcs" have to be studied; "Oceania"(suggestion) (Berlin 1984, 12/13)
For Baden-Württemberg's 11. grade unit "Arid areas ecologically endangered by salinization, erosion, desertification"- "Possibilities and limits of an extensionfor the production of food: reclaiming areas, increase of capacity" Australia is a most favourable example.
In connection with the concept of "Kulturerdteile" (culturally homogenous major regions) prescribed

for grade 8, the P.R. is an ideal area of study. Oceania with its island arcs and trenches and partly New Zealand can be selected when discussing "volcanism and plate tectonics", as prescribed, with students of grades 11 and 12.
"Natural vegetation's dependency on climate" is another topic in grade 12. The south-west and north-east areas of Viti Levu (Fiji) and of New Caledonia would be a case in point for the regional study of this objective.

Our basic strategy of structuring a curriculum being the principle "from home avironment to faraway regions", it is hardly surprising that the Pacific Region is only marginally mentioned in the curricula. Obviously not enough lessons are available to cover the Pacific Region thoroughly and completely, but hopefully sufficient examples will have been given of how to incorporate the Pacific Region into more teaching units in the Federal Republic of Germany and elsewhere.

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Bremen: Lehrplanentwurf Orientierungsstufe Bremen 1976; Sekundarstufe 1 Bremen 1979
Hamburg: Rahmenrichtlinien Erdkunde Hamburg 1974
Hessen: Rahmenrichtlinien Sekundarstufe 1 Wiesbaden 1982; Rahmenlehrpläne Gymnasiale Oberstufe Frankfurt 1984
Niedersachsen: Rahmenrichtlinien für die Gymnasien Hannover 1982
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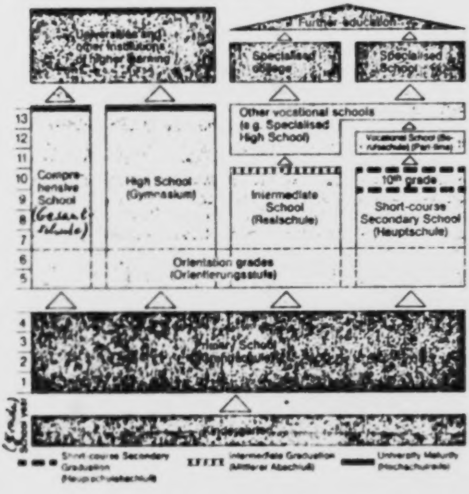
Rheinland-Pfalz: Lehrplan Erdkunde Orientierungs-

stufe 5/6 Grünstadt 1978; Klassen 7 bis 9 Grünstadt 1978

Saarland: Lehrplan Gymnasium Erdkunde Saarbrücken 1985

Schleswig-Holstein: Lehrplan Gymnasien Kiel 1986

Schematic depiction of the education system (FRG)


Universities and other institutions of higher learning
Further education
Specialised college
Specialised School
Other vocational schools (e.g. Specialised High School)
Vocational School (Berufsschule) (Part-time)
Comprehensive School (Gesamtschule)
High School (Gymnasium)
Intermediate School (Realschule)
10th grade
Short-course Secondary School (Hauptschule)
Orientation grades (Orientierungsstufe)
Primary School (Grundschule)
Kindergarten
13
12
11
10
9
8
7
6
5
4
3
2
1
(Grade) School year
Short-course Secondary Graduation (Hauptschulabschluß)
Intermediate Graduation (Mittlerer Abschluß)
University Maturity (Hochschulreife)

A Personal View on the Designing of Geography Plans in Middle School

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A teaching plan is the fruit of teachers' preparing lessons, andthe written outline in the final preparatory phase of his teaching. Through the process of working out the teaching plan, a teacher can understand the contents of the teaching materials deeply, set the teaching aims, design the teaching methods, be fully prepared for the teaching equipment and arrange reasonably the teaching processes, so as to pledge to carry on his teaching tasks successfully.

Through the teaching plan, we could see the teacher's basic skills in his teaching. Many things should be considered in the process of designing the teaching plan, but the most important is to set the teaching aims and the guiding ideology which gives demands to teaching plans. Teaching isn't merely a job that teachers pass on knowledge to students, what is more significant is to arouse students' interest in studying geography and to develop their intellectual faculties. In order to lead students to study geography well, we should make them realize that this subject is indispensable for our four modernizations (of agriculture, industry, national defence, and science and technology), and create the best circumstance for them. In our geography teaching, we should carry out the elicitation method, follow the objective laws in the geography teaching, pay attention to the characteristica of this subject, and moreover unify the scientific quality with the artistic quality.

The traditional methods have always paid more attention to how a teacher do and ignored how a student do. So the past teaching plans may be the 'teaching' plans and not be the 'teaching and learning' plans. A teacher is the designer of his teaching plan. But, no matter how excellent the plans are, they will come to nothing, if his students are short of initiative in their studies. Therefore in the course of our designing we must keep our eyes not only on books but also on the people.

1. Studing the teaching materials, determing the teaching aims

The work which contains the strategic objective is to determine teaching aims and to form the guiding ideology for our teaching. We ought to stand on a vantage point and have a far-sighted view and keep overall situation in mind. We must know the position where the teaching contents hold in the teaching system, and we must even think of the relationships between this subject and its neighbour subjects. The central contents and the general requirements for the teaching should be refected in the teaching aims, that is, what geographic knowledge and skills the students master and what progress in their intellectual faculties they should get and how we infiltrate the ideological education into our teaching.

We should understand throughly the requirements given by our syllabus and the intention of the teaching materials. Then we should analyse its structure and make clear its consistency and dig intellectual factors from it.

The relationship among the focal parts, the difficult parts and the key parts must be well dealt with in our studying the materials. Why should we emphasize the focal parts and deemphasize the less important parts? The answer is, if we don't do so, there wouldn't be enough time to finish our teaching. The core or the key in a main materials is usually the key parts in our teaching, but it doesn't mean that all the difficult parts in materials are the crucial parts in teaching. Some crucial parts in teaching are basic knoledge and not difficult, but they are important for their place in the whole chapter. We should pay attention to them when we are preparing the lessons. We must make sure of the difference and the relationship between the focus in materials and the focus in our teaching. The former is the internal relation or essence of the geographic things which have been contained in the contents of the materials, and is the emphasized parts in the materials. The latter is the parts that teachers consider to be important in accordance with the teaching aims and tasks, the base of students in studies and the features of their age. The focus in teaching shouldn't be decided until the teachers have studied on the texts deeply and researched the realities of students carefully. Sometime the focus in the materials is the focus in the teaching, but sometime not. A specific analysis is necessary here. The so-called difficult parts are those which the students couldn't understand easily. Difficult to understand is sometimes due to a relatively profund truth or a relatively abstract concept, and is sometimes due to a lack of perceptual knowledge or basic knowledge in this aspect. Generally speaking, if a difficult part coincides with a focal part, or a difficult part is a key problem, we should work out a more detailed plan and make a more thorough speech on this part, and moreover give some examples so as to expound or to bear out the part all-sidedly.(Let students explore and think deeply from theory to practice and phenomenon to essence.) But if a difficult part is the minor part in a material, we mustn't spend much time on it so as not reserve the order of importance only because the minor part is difficult. Accordingly, when we are solving a difficult point we must bring efforts to bear on the right spot. A teacher should be good at explaining an abstract concept in images and expounding a profound truth in simple language, and lead his students, from the easy to the difficult and from the know to the unknow, to explore an to think... . Once the conditions are ripe, the difficult can be readily solved.

While analysing and organizing the materials we must uphold this view, 'Everything has two aspects.' We must learn to dig into books and jump from it. It is merely relative for us to fix the major parts or the minor parts for a material and to fix the detailed parts or the simple parts for a teaching plan. Perhaps the major contents contains some minor elements and perhaps the minor contain something important. Of course in a teaching plan the writing of the major parts should be detailed, however as for the writing of the minor parts we should describe its essentials in simple language and don't miss them. Moreover, in a teaching plan the coherence of the major parts and the detailed parts should be made clear, the transition from a part to another should be smooth and the guiding ideology should run through it from begining to end.

Because the geographic things obviously have a synthetic feature and a regional feature, so it is very important for us to help students to set up the concept of space distribution. Images and pictures of landscapes are important parts in teaching materials, therefore we should make conscientious researches on them while designing the teaching plans. Maps can help us explain the rules of distribution and combination as well as interaction of the geographic things and phenomena on the earth's surface, images and pictures of landscape which can broaden students' visual field in geography are in favour of making them produce an association of ideas and deepen their thinking. We must pay attention to these features in the teaching of geography when we are desigmning and preparing teaching equipments.

2. Designing the teaching methods, preparing the teaching equipments

Whether or not a teacher himself with a wealth of geographic knowledge can pass on it to his students successfully, here is a problem of methods. Mr. Ye Shengtao (A.D. 1894-1988) said, 'To give lessons doesn't absolutely mean to speak texts and ask students to remember sentences by heart and respect it without missing a word. The primary task in teaching lies in understanding profoundly the contents of a well- compiled text and helping and leading students to observe, to experiment and to think. A solid foundation must be laid for students' further studies in the future... .' (See 'China Education Gazette', Feb. 18, 1984.) The particularity of teaching activities make it a rule that the teaching and learning in geography, like those of any other subject, neither exists independently outside a given substantial form, nor is transmitted by such direct ways as handing it from hand to hand, exchanging it from mouth to mouth and passing it from brain to brain; it must be transmitted through substantial mediums in order to get certain material forms, in this way, the teaching might be possible. From the viewpoint of the theory of system, the teaching process always assumes certain activities which differ in nature, in level and in form, and it is a whole. A teaching must give consideration to every side and mustn't adopt this way, 'not seeing the wood for the trees.'

From the viewpoint of the theory of information, all kinds of information transmitted by a teacher to his students, apart from the scientific and intellectual value in teaching materials, what teaching method and what kind of equipments and what sorts of artistic language the teacher has used can bring about different effects with the same information. Therefore what a teacher has taught does not mean what his students can understand. A teacher should not become a 'porter' who always carries bags from a place to another when he is imparting knowledge to his students, his sacred duty is try to open students' intellectural windows and to give them a key for the knowledge treasure house. There are various specific teaching methods such as traditional lecture, talking, analogy, observation, synthesis and analysis, and so on, which summed up by our predecessors and have had their original ideas. With the innovation of geography teaching methods, apart from using many modern methods of other countries for reference, a lot of comrades in the forefront the geographic teaching have initiated quite a few of new methods with our national features such as guidance-based self-study, intensive learning, underguidence learning, progressive heuristic method with question- raising and the method of combining readaing, discussing, lecturing and practising, and so on. But each method has a common feature that they all have taken the heuristic method and self-study as guiding ideology and stressed that teaching activities must conform to the rule of cognition to man and must arouse students' desire in themselves for knowledge and develop intellectual faculties by their contradictory conflicts in thinking. A teacher who play a leading role should keep his eyes on 'leading' in earnest, and not on 'crammong'.'Taking the tide at the flood' means a teacher should lead students along their 'train of thought', and not mean that he gives his students mechanical requirements to ask them to answer questions only in accordance with what his teacher has written down. On a crucial problem, teachers should lecture throughly, but the lecture also has two aspects, that is to say, on the basis of indepedent thinking by students, teachers can put forward a question to his students; if the answer is right, teachers should find out how the answer is right and why is right; if the answer has a typical mistake, we also make sure how it is wrong and what cause the wrong; if necessary, even we can use the 'reduction to absurdity', that a concept which contains some typical mistakes has been raised on purpose and then it can be clarified by students themselves in discussion. Thus, students could be impressed more deeply by proving pro and con. As for the time of a class, it is unscitable to take up much time for teacher's lecture. What a teacher has said may be too much and too detailed, and this would replace what students should think by themselves, in this case we would rather let them think "in activity" then the teacher lecture "through".

Teaching aids and teaching equipments are directly concerned with the effect attained in teaching. Some good wall maps, hanging charts, pictures and models are able to help students better think in terms of images. Some geographic audio-visual education means also can help us understand the contents of the materials more scientifically and more distinctly. However, it will not be good to use so many aids in our teaching. Because the use of a large number aids had diverted the students' attention in some "performance teaching", we should take warning.

3. Arranging the process of teaching reasonably

In designing the process of geographic teaching, we ought to pay attention to the whole "teaching and learning" system after we have determined the teaching guiding ideology. Further we should put the teaching activity into a good order and make the information transmission between teacher and student be in the three-dimensional and multi-directional condition in order to adjust the leading role of teacher and the enthusiasm of students to the best state.

In the past time, when we were designing we often regarded organizing, reviewing, lecturing, consolidating and assigning as five important links. As the inheritance and the using of the experience of our predecessors for reference, it is reproachless, but making the "five links" fixed will be unsuitable. On the contrary, we shoud strive to go on improving and creating on the basis of summarizing our fresh experience.

Moreover, it is of importance to choose the type for a class in the process of teaching. For instance, the effect will not be good if we do not follow the rule which should be follow in "a class if reviewing". The enthusiasm of students will run high, if we use the method of field observation as a auxiliary method in natiue geography teaching. The so-called "type" reflecting the character of a class is the exterior form of speciofic expression of teaching contents and teaching aims. The different "types" have their orders and their phases in the processes of teaching, the organic combination of the orders and phases forms the structure in a class.

From the viewpoint of theory of system, the structure of the teaching process is also a system. The so-called system is a relatively stable and unified organic whole consisting of related factors of a given quantivy. In the process, the activities that students obtain knowledge and develop their intellectual faculties on their own initiative take the form of listening, reading, looking and writing whose core is thinking and language training. In the process if the activities resort to this approach which a teacher lectures and students learn, the information transmission will be the cramming method and in the two-dimensional and unidirectional state; students will have little room for creative thinking; the activities of listening, reading, looking and writing will not gain a synthetic development and teaching effect will be influenced. If teachers pay attention to lead students to study by their own and to think independently, and pay attention to the development of necessary discussion, thus the students will not only take more initiative in their thinking, but the information transmission will be in the "two-directional" and "three-dimensional" state as well. At the moment if the teachers are able to grasp correctly the feedback information from students and control properly, and "combine" the students' train of thought with the teachers', the activities will get the best structure.

In the process we should think of students from begining to end. Teaching effects and teaching quality lie crucially in what students have learned and not in what a teacher has taught. Here is a problem of "learning fewer but better and understanding fuller. In the past, many teachers inclined to the view, "concisely lecturing and practising more". The idea, "concisely lecturing" meets with approval, "practising more" warrants consideration. Moreover, the view, "combining lecturing with practising" is not bad, but too much practice may be a heavy burden for students. Thus, apart from what students have understood, students should be given strict practice until they understand well. The depth of teaching should be suited to the level of most students and can have some elastictivy". In the course of practice, we must carry out the policy of teaching students according to their aptitude and give different requirements to studdents of different levels, making the advanced 'be full' and the poor be able to 'digest'. Because the time for the various phase of teaching structure is by and large in proportion, (of course, a flexible adjustment is permitted.) a teacher should control the time precisely in his teaching, it may not be good that some teachers remain to spout eloquent speeches when they have heard the bell rings. (The headmaster of Yucai Middle School of Shanghai had announced to the teaching staff that, in order to remind the teacher of finiching the class on time, the monitor has the right to order "stand up".)

Geographic teaching is a science, and on art as well. We must therefore not only consider the scientific structure in the course of geographic teaching, but also research the beauty of the structure of a geography class further. How to begin a class? How to bring it to a climax? How to raise questions and organize discussion? And how to end the class? All these are directly concerned with the students' mood. Generally speaking remark must be concise and able to arouse immediately the students' interest and catch their attention. The concrete ways could be either coming straight to the points or arranging cleverly metaphors and plotting riddles on purpose so as to stimulate students' imaginations. Thus, students would be enthused in one or two minutes. One students are in high spirits, their train of thought will be unlocked and their thinking will be in activity. This is a 'golden time' in the process. The core of the teaching should be in full swing at this time. That is to say, more teaching contents could be given now. We must bring the activity gradually to the high tide while the students are still in the ascendant. If the information transmission between teacher and students is controlled properly, 'a good achievement' will be in sight. This is what Confucius (551-479 B.C.) once said, "not inspire one until he is in high spirits, and not arouse him until he is jolly'. If students have no psychological preparation and are not in the "very moment" at which they want to know solnething but they could not say anything, the teacher need not cram the knowledge down their 'throat' alone. Once the students concentrate their attentioin on studying and go all out to do it, the teacher must seize the opportunity and bring the teaching to a climax, and at the same time finish the very core of the teaching. But it is unsuitable for us to prolong the time of strengthening memory, imagination and thinking and violate the notual laws of excitation and inhibition. Therefore after the process reaches its high tide, we should give a small "adjustment" so as to let students get a chance to make the knowledge tidy and store up the information effectively in their brains. Because there is a process of cognition in students' and the comprehension has its stages, the melody of teaching should have its rhythm. Sometimes like "opening a sluice gate and letting the water turbulently rush down"; Sometimes like a slowly and windingly flowing brook. In the teaching the manner of tension alternating with relaxation and excitation alternating with inhibition could make the exciting cerebral cortex of students take a reasonable rest, the teaching frequency becomes "smooth" in the "fine turning", and the students' thinking maintain their vigour of youth forever.

A class ending is not only like 'damming a current', being brief and forceful and having a feature of stages; but also like 'closing with unfolding', leaving the suspension and a vast field to students for their thinking independently.

In the process of teaching, the perfection in the mood structure of teacher and students are directly concerned with the teaching effect. Every word and deed of the teacher should show concern for his students. The teacher whose mood is bold and prompt, and whose attitude is solemn and natural will give students more encouragements and more influences. All these should be considered in our designing. In brief, if a teacher prepares lessons conscientiously and all-sidedly, and works diligently, his students will be affected and will study hard for our four modernizations.

4. Researching the realities of students' knowledge and students' thinking carrying out the policy 'teaching students in accordance with their aptitude'

The teaching aims must be carried out finally to every student. Sometimes a teacher with a well- designed teaching plan couldn't arouse students' interest in studying, the teacher talks on and on, but the students take in less and less.Here is a problem of "knowing the students and being good at teaching", the more the teacher knows his students and harmonious their relationship is, the more easily the teaching will succeed. If a teacher couldn't arouse students' interest, the reasons may be that the 'starting-point' of teaching is too high and students couldn't understand well, and the students have mastered some contents their teacher has taught and couldn't concentrate their attention on it. So the teaching art can not only inspire the students' desire to study willingly, and put them into a popsitive place at which they can study with more initiative; but can also give the 'elastic' requirements to the teaching, thus carrying out the policy of "teaching students in accordance with their aptitude".

Teaching is a functional system, the 'information' which is reflected while the students answer questions, do exercises, are tested, and examined in a class, is the important factors which influence teacher in preparing lessons. A teacher must do what he can and know his students in studying and thinking by all means. The more completely and more accurately, the better.

Dealing with both the teaching side and the leaening side, on the one hand, the teacher should know his students and be good at teaching; on the other hand, students should know their teacher and be good at learning. Only when students and their teacher know each other, the educational information exchanges smoothly and is controlled properly, can the teaching achieve an ideal effect.

The Song Dynasty educationist Zhang Zai (A.D.1020-1077) once said, 'If one is absent-minded and with narrow interest, he will get nothing through learning.' That is to say, a student who is "absent-minded' will not study well. A teacher therefore must not only teach students to master knowledge, but also help them take a correct attitude towards study. A negative factor students take in their studying is often inseparable from their lack of a motive force of studying and the knowledge. If a teacher wants to know his students, he should bbe concerned for them and help them , especially those who do not do well in their studies. Only when the teacher is concerned for them and do not discriminate against them, will students be willing to confide in their teacher and can teacher understand really what is difficult for their study. Only by having a tacit mutual understanding will the information exchange be high-quality. If a teacher only keeps his eyes on books and only keeps his teaching plan in mind, the exchange will have no depth and no brightness, and it will be difficult to raise the teaching effect. Concequently, knowing the realities of students is an indispensable and important link.

5. Pay attention to the developing of students' intellectual faculties

At the present time, we have begun to notice how to develop students' intellectual faculties ingeographic teaching. But, some comrades think that more effects will be got, if we grasp the "two basics" (basic knowledge and basic skills) than we grasp the 'intellectual faculties', it will not be so easy to carry out the step of grasping specifically students' intellectual faculties while designing the teaching plans. Other comrades think that although it is good to develop students' intellectual faculties, the heavy loads for students, few class hours for geographic cation and limited energies for teachers, make the step be comething like 'distant water which can not put nearby fire'. Therefore, they are relutant to put a lot of efforts in their preparing. A improvement would be needed here, I think. We must make students master the knowledge and skills and develop their intellectual faculties in geographic teaching. We should firmly believe that, the two things could supplement each other. Now, in the course of our research on teaching and our desiging, we must pay special attention to the developments of students' intellectual faculties. This is an important link to raise our educational quality at root. First of all, we should decide under the guiding thinking, that the development of intellectual faculties shall not be a dispensable 'soft task' and must be constantly strengthened with the deepening of the educational rerform. We should realize that, develop 'students' intellectual faculties could help them master the geographic knowledge greater, faster, better and more economically. As for the choice of the contents of the materials, we must not only choose the geographic knowledge consisting of more intellectual factors in the materials into the conditions which can bring about the development of students' intellectual value between the choice if the 'geomechanics' and the choice of the 'plate tectonics', which explain the course of the topography of our country, and it is also different from the lovel of developing the students' thinking that the knowledge whether is passeed on by teacher or is understood independently by students with the discussion organized by their teacher. Hence, in our designing we should think of chosen contents which can help students develop their intellectual faculties as well.

The education of partriotism and other education of political thought in our geographic teaching is able to bring various intellectual factors into play at root, thus becoming the motive force to develop the intellectual faculties. This is the first thing that could not be ignored. Judging from the contents of development, thinking is the core of the development of the intellectual faculties, observation is a guide to thinking. The one-sidedness in observation necessarily leads to the limitations in thinking. The gradualness in thinking requires that observation need a progressively deepening course. Memory is the reflections or reproduction of old things in our brains. In our teaching we must intensify the memorial marks, especially the crucial by all effective means, so as to create a foundation and a condition for students' thinking. In our designing, we must pay attention to the cultivation of students' abilities to keep in touch with practice and to explore the unknow on the basis of the knowing knowledge. An imaginative ability to create the new images is a kind of special form of thinking, and an important sign of creative thinking. It is necessary to encourage students to break the thinking which has been shaped by traditional customs, to allow them to put forward new ideas which may not be agreeable to the teacher's and to apply the way of diversifying thinking, taking an all-sided view of things. The questions to students put forward by teacher could have different but correct answers. So, the elasticity in thinking could be shown. This will help to keep the students in great suspense, thus having an ability to change students' fixed way of thinking. In our present geographic teaching innovation, it appears that special emphasis must be given to developing students' intellectual faculties and particular to cultivate their ability of self-study and creative thinking. If middle school students have a too heavy load and can not digest what they have learnt, it will certainly influence the normal developments of students' intellectual faculties. Only when students learn a bit less but a bit more succinctly and flexibly, will they be able to learn more actively and will we be able to bring constantly the newest developments in science and technology into our geographic teaching. In his inscription to Jingshan school in Beijing, Comrade Deng Xiaoping points out, 'education must face the modernization, must face the world, and must face the future'. It may be our signficant starting point that in the designing of our teaching plans, we must reflect this guiding thinking and stress self-study and develop students' intellectual faculties.

Teaching styles in geographical education

INNOVATIONS IN COLLEGIAL GEOGRAPHY: A CHALLENGE FOR REALISM

Patricia Green-Milberg

ABSTRACT

The purpose of this paper is to discuss how one educational establishment has tackled the many problems related to field work, by taking the relatively unusual step of employing audio-visual materials in different and challenging ways. The accompanying videotape presents visually how this was done, and the response of students to this method of learning.

The difficulties that face anyone attempting work in the field in geography, or any other subject, are legion and daunting. (Everson 1970).

The purpose of this paper is to discuss this key problem in relation to one educational establishment's handling of the challenge and how it has innovated programmes that are both stimulating and gratifying for the student.

In order to place the innovation in perspective a brief historical survey follows.

Geographic educators have traditionally placed considerable importance on field work as a necessary skill of the geographer. Even in the nineteen twenties Fairgrive's teaching was emphatic and uncompromising that, geography should be learnt through the soles of ones boots. (Fairgrieve. 1926).

Field work enables the student to observe and correlate in the landscape what the classroom is, and is not, able to teach. Integration of field work with course work is entirely natural since the problems investigated arise from the latter in a spontaneous manner. (Tidswell 1970).

Field work and the field trip carried out by an individual or group becomes the means of learning geographical concepts by direct observation of the landscape, however, whilst the field trip as a learning exercise is exceedingly valuable, restrictions of various kinds frequently hinder its use.

In the Quebec CEGEPS (Collège d'Enseignement Général et Professionnel) as in many institutions of higher education, there are many restrictions encountered when attempting to implement a field exercise.

These include:-
Location: Distance is always a major factor in Canada.

Climate: Due to severe frost, heavy snow fall and spring flooding, the terrain is inaccessible from November to May. Thus the actual time frame for field work is limited to about 6 weeks during September and October, and less than 1 month in April/May. (The CEGEP year runs from September to mid May.)

Financial: Finance is always a problem and the assistance given by the individual CEGEP varies greatly from subsidized funding to no financial support at all. Lab. fees are an additional cost factor to students.

Time: The 'Cahier' or 'Programmes et Cours de Diplôme d'Etudes Collégiales' recommends field work but does not offer course credit time for it to be carried out, therefore limiting the extent and distance of any field work (Cahier 1987-88). Traditionally some of these problems have been solved by investigating only the immediate neighbourhood, and utilizing the weekends. In addition many collegial instructors devote substantial parts of their weekends or vacations to preliminary studies of the field area, selecting routes and study materials and making a ground reconnaissance of the area, usually at their own expense. All of these factors are further compounded by the fact that increasing numbers of students are involved in the labour market and are unavailable out of formal college hours.

In order to overcome these difficulties and to actively involve our CEGEP students in more relevant learning, innovative teaching techniques have been developed at CEGEP JOHN ABBOTT as a partial solution to the field work experience.

Collegial Geography Departments up to the present 1988, have been responsible for setting their own examinations, free from input by the Ministère de l'Enseignement supérieur et de la Science, of the Government of Québec. The only requirement has been that instructors follow the guidelines in the official 'Cahier'. A document concerned more with illumination than recommendation. As this is written in French without an official English translation, there has existed a liberal interpretation of the material to be covered and the methodology to be followed. This has therefore opened the way to experimental teaching practices, where instead of the mode of teaching relegating the student to a passive role, the student is encouraged to actively become involved in his/her own learning. As was reported in Freiburg 1984. (Green. Strachan and Milberg) the John Abbott geography department has become actively involved in the production of field work videos that provide learning relevant to the student's immediate environment. Following the success of the first video (The Rouge: A River of Quebec. Freiburg 1984) others have been produced, these include: Arvida, Kingdom of the Saguenay, and Mapping the Home Environment.

Each video is part of a module of self instructional materials produced in the department.

During the years 1983-1987, surveys have been kept of student's learning activities, in order to establish the status of field work undertaken in the Introduction to Physical Geography Course (Cahier: 320-111-79). Each year one group of students has seen the video once and then participated in field work in the same field area. The field experience involving 16 hours of participation. The second group of students becasue of climatic conditions making the area inaccessible from November to March have utilized only the instructional module. The instructional module contains, objectives, a reading list, topographical and geological maps, a manual and a package of self instructional materials, including a video of the area. The student works his/her way through the module at his/her own pace and upon completion takes a self administered computerized examination. This approach is a far cry from the traditional observer/listener role in the classroom. During the fall semesters of 1984, '85, '86, 3 surveys were conducted amongst the group of students who had participated in field work and had seen the video once. A questionnaire was formed and administered shortly after the field experience; the objective, was to discover what factual knowledge had been retained about the field study area. Other objectives, specifically:

: to teach the value of careful observation.

: to understand the regional concept and to know that generalizations of geography, in part at least depend on the scope or scale of the area being studied.

: to analyse the relationship between the human activities and the geographical conditions of the Upper Rouge (Green-Milberg 1983).

were evaluated in the individualized assignments and projects of the instructional module.

The questionnaire Appendix A included questions on the economic, human and physical geography of the region. The results of these surveys are shown in Figs. i, ii, iii. The figures showed that the overall percentage of error was small, Questions 5, 9, 15, having the greatest error.

During the winter semesters of '85, '86, '87 the same questionnaire was administered to the group of students who had used the instructional video module, the results of these surveys are shown in Figs. iv, v, vi.

Item Analysis Charts - Figs. i - vi

Figure i

Fall Semester 1984.

Question number.

Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1p4					x					x					x								
2k4	x				x																		
3I4								x											x				
4H4	x				x										x								
5F4					x																		
6E4															x								
7D4								x							x								
8I4															x								
9J4	x				x			x							x								
10G4								x															
11E4					x																		
12P4																							
13A4								x															
14C4															x								
15K4								x							x								
16T4	x				x			x															
17L4																							
18M4															x								
19M4															x								
20T4																							
21S4								x															
22H4															x								
23S4			x								x												
24J4																							
25J4			x								x												

Figure 11

Fall Semester 1985.

Question number.

Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1h5					x				x											x	x		
2w5	x																						
3e5					x				x											x			
4r5	x				x				x						x								
5v5					x																		x
6p5					x										x								
7l5					x				x						x								x
8t5															x								
9jr	x				x				x						x								
10t5									x														
11e5					x																		
12h5																							
13e5									x														
14j5															x								
15rw															x								
16er	x				x				x														
17t5	x					x																	
18p5															x								
19c5									x						x								
20k5																							
21s4																					x		

Figure iii

Fall Semester 1986.

Question number.

Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1b6																							
2t6	x				x				x														
316									x												x		
4p6					x				x														
5e6					x																		
616					x										x								
7j6					x				x						x								
8p6															x								
9p6	x				x				x						x								
10w6									x														
11s6																							
1216	x																						
13v6									x														
14p6															x								
15o6																							
16m6	x				x				x														
17k6					x					x													
18w6															x								

Figure iv

Winter **Semester 1985.**

Question number.

Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1 5										x													
2 5					x				x														
3 5					x				x												x		
4 5					x					x													
5 5																							
6 5															x								
7 5									x						x								
8 5															x								
9 5	x								x						x								
10 5									x														
11 5																							
12 5																							
13 5									x														
14 5																							
15 5													x										

Figure v

Winter Semester 1986.

Question number.

Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1 6													x										
2 6																							
3 6							x													x			
4 6									x														
5 6	x																						
6 6																x							
7 6									x							x							
8 6																x							
9 6							x							x									
10 6							x																
11 6																							
12 6																							
13 6									x														
14 6																							
15 6														x									
16 6	x																						
17 6						x																	

Figure vi

Winter Semester 1987.

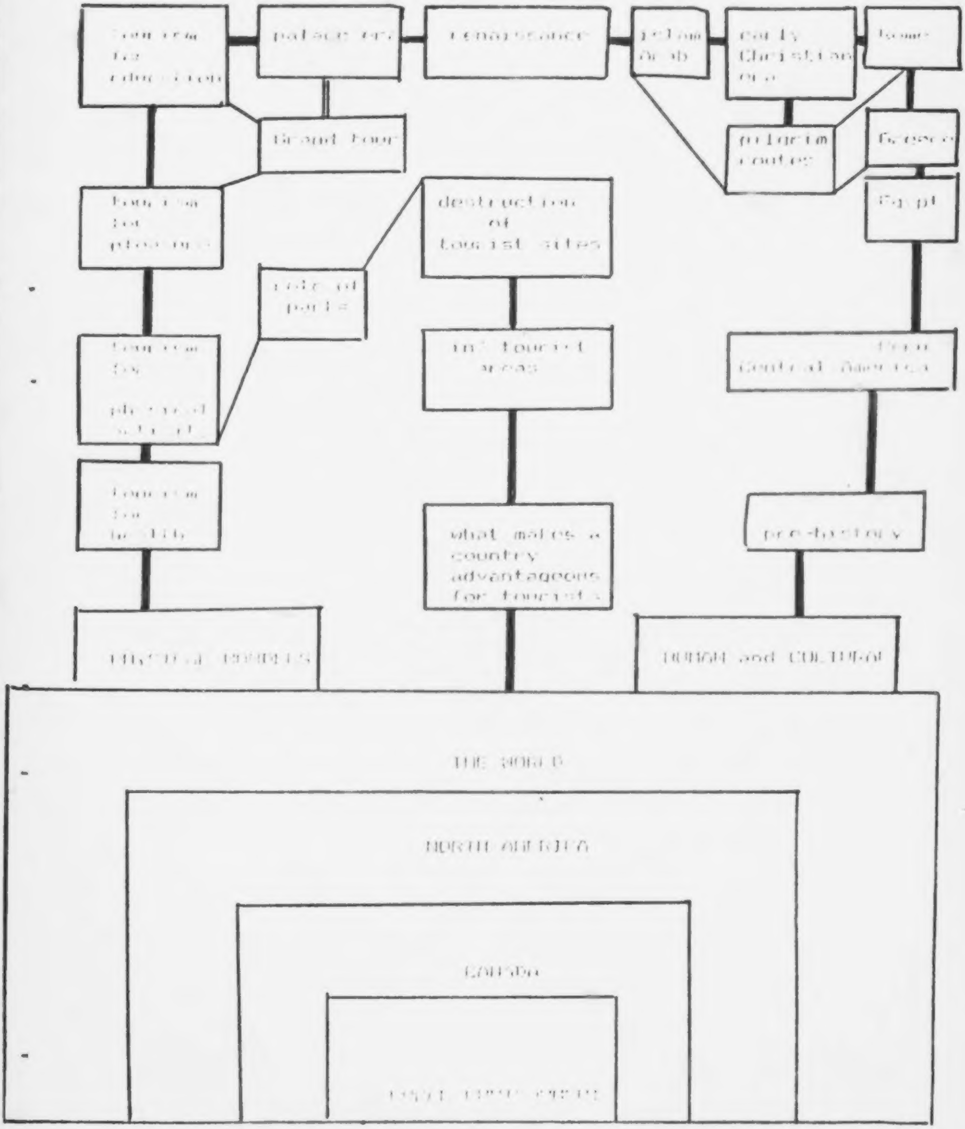
Question number.

Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1 7															x								
2 7	x																						
3 7									x												x		
4 7									x														
5 7					x																		
6 7																	x						
7 7																x							
8 7																	x						
9 7									x							x							
10 7					x																		
11 7					x																		
12 7																							
13 7									x														
14 7					x																		
15 7																							
16 7					x																		
17 7																							
18 7																							
19 7									x														
20 7									x														

Figure vii

Themes for the Course.

Geography of Tourism: 320-


tourism for education
palace era
renaissance
Islam Arab
early Christian era
Rome
Grand tour
pilgrim routes
Greece
Egypt
tourism for pleasure
destruction of tourist sites
role of parks
int'l tourist areas
Peru Central America
tourism for physical activity
tourism for health
what makes a country advantageous for tourists
pre-history
PHYSICAL THEMES
HUMAN and CULTURAL
THE WORLD
NORTH AMERICA
CANADA

The results indicate a good retention of learning with a substantial decrease in error in questions 5, 9, 15. One possible reason being that, when in doubt, a student is able to replay the video: One noteworthy outcome of the exercise amongst both groups was the effect of field work upon attitude. This was more immediate among the first group than that on attainment. The positive attitude (unmeasured but seen and heard by faculty) generated by the field experience was so favourable that 1/3 of students who had participated in field work, returning to take other geography courses, cited field work being offered as the prime reason. John Abbott College (Geography Department internal data 1985-1988).

One noteable addition was that a random class survey of 103 winter semester physical geography students indicated that 73% of them between 1985-1987 had subsequently visited the field area. (John Abbott College: Geography Department).

Time, finance and climate control that of field work location. In the course Geography of Tourism (cahier 320-216-75), time and finance are insummountable problems. To give students vicarious travel experiences, other teaching methods had to be implemented (Fig. vii: Themes for the Course Geography of Tourism.)

Students can experience an almost unlimited diversity of learning experiences through the medium of slides. Slides infact are of primary importance to the geographer and the geography instructor. The raw material of geography is the surface of the land, or landscape, and slides are one of the simplest and most direct methods of importing this material into the classroom.

Slides form an essential and vital link between the outdoor and indoor study. They encourage field work methods in the classroom, and if used well, more successful analysis of landscapes can be carried out indoors with the right slide, than upon a bleak and windy hillside with the real thing (Long and Robertson 1966).

Multi-screen projection allows two or more images to be shown simultaneously, making it possible to view a close-up of a map area at the same time the landscape of the area is shown. In addition students show considerable interest in looking at well chosen slides. Good slides are not merely observed but considered and analysed. In the course Geography of Tourism at John Abbott College, a strategy was devised to impart maximum relevance and meaning to slides shown in the classroom and for the slides to take the place of field work.

The course Geography of Tourism has a double structure, composed of: a) a teacher/student strategy and b) a student/teacher strategy. The teacher student strategy involved the instructor introducing the tourist places of the world through the means of slides. A series of themes and sub themes take the student from his home environment around the world (Fig. vii) introducing him/her to an ever widening sphere of experience based on the Taba Model (Taba. 1962). In order to develop this design it was necessary to identify a basic element: that, a large majority of Canadian students have very little knowledge of either their home, national or global environment. (CFCF (C.T.V. Canadian Television: Pulse News: 1988) Appendix B. 1988). The course design establishes a sequence of learning experience which allow the student to widen his/her knowledge and at the same time strengthen his/her basic skills. eg all students must be able to locate the site of each slide on the maps provided. The efficient use and co-ordination of hundreds of slides used in the course have involved a complex re-thinking and restructuring of the traditional course of teaching. Emphasis is placed on clearly defined learning behaviours rather than on teaching objectives as commonly interpreted by subject-oriented instructors.

Properly selected, the combinations of slides serve as an effective and efficient means by which the geography student is introduced to both the 'sights and sites' of the world. The rationale for this, being that unless there are visible sights, eg. waterfalls, mountains, etc. the tourist will not visit the locational site, hence in this course, emphasis is placed on 'the sights'. The various themes outlined in Fig. vii emphasis this concept.

A major instructional value of the slides is the sequential order. Subjects are treated in a logical order and learning sequences are developed step by step. When a detailed analysis is required, the slide can be held for as long as needed.

The vast majority of slides have been photographed by the instructor or colleagues, with additional commercial slides added. Slides of maps, charts, diagrams and tables are added where appropriate. The use of this slide technique permits the instructor great flexibility in arranging interesting and unique learning situations. Theme selections from thousands of slides enable the student to visit sights and sites that would normally be inaccessible. Educational research shows that slides are an efficient instructional approach (Allen 1960) and whilst they cannot replace field work, in the Geography of Tourism, they serve the teaching purpose better than another learning device or medium.

Vandermeer stressed that pictures must contribute something unique, if they are to be more effective than words in the learning situation (Vandermeer 1950). The vast selection of slides, graphs, maps and diagrams used in this course communicate visual ideas which greatly enhance the students learning.

Part of the course evaluation is based on slides previously shown and accumulated data on this particular part of the overall evaluation indicates that the slides shown in this course are an effective learning experience (Kevan 1988).

The student/teacher strategy involves a research project. The student is expected to research the tourist potential of a country of his/her choice. This project involves library research, and direct information from original sources e.g. information available from the chosen country, direct contact, interviews with people who have visited the country). The project is researched during the length of the course (one semester of 45 hours) and is rigidly controlled by the instructor, as to length, content, written and visual, statistical information (only the most recent statistics are permitted) and presentation. The end product is a modern tourist guide to the 'sights' and 'sites' of the selected country.

Whilst learning takes place most easily and naturally through actual experiences reality dictates that this is not always possible, and recognizing this the Geography Department at John Abbott College has attempted to place an emphasis on realism, student involvement and a realization that understanding is more important than rote leaning. The two courses described are largely based on visual aids, and to do this effectively a rethinking and restructing of traditional courses was undertaken. A relatively unusual step at the CEGEP or University level where a large number of professors still have a natural reluctance to exchange the comfortable and familiar lecture methods for unknown alternatives.

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APPENDIX A

Post test

1. How long is the Rouge River? ______________________________

2. Where does the Rouge River rise? ___________________________

3. The Laurentian Plateau is called an __________________________

4. An ungraded stream has ___________________________________

5. What mineral is mined at Kilmar? ___________________________

6. What limits agriculture in the Rouge valley ? ________________

7. What kinds of trees dominate the Rouge a) __________ b)________ c) ______________

8. The downward drainage of soil is called? _____________________

9. The spring flood is called? ________________________________

10. C.I.P. means? ____

11. What is the dominant farming in the Rouge Valley? ____________

12. Skiing dominates at _____________________________________

13. Canoeing and white water rafting are found between ___________

14. Glacial striations are found at ____________________________

15. Settlement by French Canadians was called? __________________

16. A mechanised saw mill is found at? ________________________

17. The Rouge valley was surveyed into ________ in the 19th Century

18. Oxbow cut offs are found at _______________________________

19. Glacial fluvial deposits are found at _______________________

20. The edge of the shield is called the _______________________

21. The first power dam was established at ______________________

22. The first railroad was built in ____________________________

23. The future of the area lies in _____________________________

APPENDIX B

During the week of March 7-11, 1988, the Canadian Television network of CFCF-TV Montreal broadcast on Pulse News the results of a survey carried out by them. The survey questionned 300 high school students in six Canadian cities. Among the questions asked were:

Name 3 African states : response 60% incorrect
Name 3 European states: response 82% correct
Name all continents : response 35% incorrect

To each question, Montreal High School Students scored the lowest.

Directors from many Canadian School Boards concluded that the status of Canadian American and Global Geography was extremely poor.

GEOGRAPHY CLASSROOMS OBSERVED: A VIDEO PROJECT

W. Ashley Kent
University of London Institute of Education

Abstract

This paper is about a video project concerned with changing teachig strategies in modern geography classrooms. The catalyst for such changes is in this case Information Technology (IT). Eight classroom case studies are portrayed by the video across a range of student ages, types of geography and teaching strategies. It suggests that IT is one way in which enquiry-oriented and non teacher directed work can be achieved in geography classrooms. It is hoped that this initiative will be the first of other video ventures by the IGU Commission on Geographical Education so that classroom experiences can be shared more widely.

Introduction

The heart of this paper is about changing classroom strategies and relationships and not information technology (IT). IT happens to be a medium which has stimulated such changes, but equally effective media include new syllabuses, assessment or textbook resources. The potential for substantial changes in teaching strategies is particularly great in the U.K. now since the recent introduction of the General Certificate in Secondary Education (GCSE). This demands a minimum 20% of possible marks going to coursework assessment and has substantially reduced breadth and increased depth in the delivery of the curriculum. Modular syllabuses such as Geography 16-19 allow the opportunity for considered enquiry and thus student-teacher relations in some cases have been transformed.

From the earliest days of IT in Geography (Shepherd et al, 1980) it was clearly seen that the presence of a microcomputer in a classroom changed that environment. Teachers became engaged in the mysterious joint discovery with pupils of hardware and software, and indeed pupils were often relatively empowered through their greater skills and knowledge of this new resource. Previously alienated and disaffected young people were seen to become involved and motivated in ways previously deemed impossible. It was as if the magic of PAC-MAN was beginning to touch education! Because early adventures into IT by geography teachers usually involved one microcomputer and a geography simulation, it often necessitated group work and a 'cafeteria system' of class management. That is not to say that many teachers did not use the 'electronic blackboard' (transmission/response) teaching strategy to reinforce traditional pedagogy, but that it allowed the real opportunity of a more interactive classroom where pupils were more engaged and involved in the learning process.

IT in geography in the U.K. has a relatively long history given the compressed timescale and experience of IT in education generally. Much software has been published as evidenced by the 75 pieces of software reviewed in Teaching Geography between June 1983 and October 1987. Many of these represent packs of several programs and are but a sample of what is now commercially on offer to geography teachers. Written guidance to teachers considering the use of IT in geography has been considerable: for example see Fox and Tapsfield, 1986; Kent, 1986 (a) and (b); Kent and Riley, 1988; Watson, 1984; Midgley with Walker, 1985. Also a growing body or research into IT in geography has emerged though rather piecemeal, limited in scale, lacking in coordination and unfunded: See for instance MA dissertations completed at the University of London Institute of Education, such as Grummit, 1987; Freeman, 1981; Robinson, 1982; Cummings, 1984; Thomas, 1985; Jefferys, 1987.

However, in spite of this constructive encouragement, the innovation of IT in geography classrooms has yet to 'take off' in spite of Shepherd's claim that it was imminent in 1980. The present U.K. government has espoused computer-assisted learning across the curriculum and consequently set up the Microelectronics Education Support Unit (MESU) in January 1987 with the aim 'to promote and spread good practice in using the new technologies in education'. A particular strand of its development is the support for pre- and in-service teacher trainers. A further recent development is the imminent appointment of 650 new advisory teachers appointed by local education authorities and paid for by the Education Support Grant for 1988-1990 to encourage subject specialists to use IT in their curriculum areas. As far as geography is concerned there are two MESU policies which are encouraging. The first is the sponsorship of an in-service pack to help geography teachers explore ways of using computers. The pack is aimed at middle and secondary schools and has a focus on today's geography curriculum (MESU, 1988). This innovatory development consists of eight modules, each including case studies illustrating the use of software in classrooms; examples of classroom and in-service activities; also classroom materials including commercial software. The second MESU initiative is coordination of IT in geography in-service education and training via a regional network of coordinators who are staff in the country's university departments of education. So the in-service pack and the coordinating network are the latest efforts to encourage geography teachers to integrate IT in their lessons. The video project which this paper describes is a conscious effort to complement such important initiatives.

Main Text

The advantages of classroom video in in-service education of teachers are clear. It is almost as effective as taking a teacher into a classroom where progressive pedagogy operates and goes some way to answering the doubts of the sceptic who feels 'I couldn't do that with my lot' or 'I am sure that wouldn't work!' Either within a geography department or in a teachers centre it allows geographers to explore the classroom management issues which often loom so large. It can go some way to answering questions such as 'I have one micro - how can I possibly manage a class of 30 with it?' When the classroom video has aded to it conversations with teachers and pupils using the new technology then the impact can be greater. Finally and frankly, regardless of the IT spinoff of this video, there are insufficient classroom videos of contemporary British schools illustrating modern classroom processes as the author can well testify wearing his teacher training hat!
This video is the beginning of an attempt to put together several video compilations of classrooms. More are needed if we are to overcome the substantial inertia of classroom approaches in our schools.

The guidance sheet given to contributors is shown in Figure 1 and indicates that the major objective of the video and accompanying notes was as a teacher training resource which could be subsequently used as a resource for research in geographical education. The project had its inception at the Regional Meeting

Fig. 1

INTERNATIONAL GEOGRAPHICAL UNION

COMMISSION ON GEOGRAPHICAL EDUCATION

THE NEW TECHNOLOGY IN ACTION IN GEOGRAPHY CLASSROOMS

A VIDEO PROJECT

OBJECTIVE To produce a videotape of geography classrooms from the U.K. in which new technology is involved. This would provide an important resource for teacher training and research in geographical education both in the U.K. and overseas.

Details

1. By the IGU Conference in Australia in 1988 a compilation videotape with accompanying notes would be available for sale. Any profits made would go towards the IGU Commission on Geographical Education.
2. The focus is to be on varied teaching strategies and styles - a major theme of the SKILLS IN GEOGRAPHICAL EDUCATION Conference of the Commission for Geographical Education, Brisbane 1988.
3. The geography lessons would attempt to portray a range of teaching/learning strategies dealing with both up to date teaching strategies and software/hardware.
4. New Technology here means the use of computers, interactive video, teletext, satellite imagery i.e. broadly interpreted.
5. Classrooms should portray to 11-18 year olds learning geography.
6. It will help support the CGE INSET Pack to be available by January 1988.

The Video

1. Each contribution should be between 5-10 minutes in length.
2. Should be preferably on high band Sony U-MATIC format for the PAL standard. Alternatively VHS for the PAL standard would suffice.
3. The final compilation tape would be distributed in VHS format and all participants would receive a copy. It would be between 60 and 90 minutes in total length and would have about 10 separate contributions.
4. The permission of teachers and pupils filmed is needed to allow use of the tape across the world for teacher training and research. Probably head teachers will need consulting on this.
5. Each contribution should be an edited version of a lesson showing the various 'elements' of the lesson i.e. various activities undertaken by pupils and teacher. For instance pupils working in groups; pupils at a microcomputer; teacher issuing instructions; teacher explaining to students; opening the lesson; developing the lesson; closing the lesson etc.
6. It should be a self contained summary of classroom activities i.e. coherent in its own right.
7. The different 'elements' of the lesson need to be separated by gaps of up to 15 seconds and possible explanatory captions should be sent to Ashley for inclusion.
8. The sound (i.e. pupil and teacher-talk) would need to be audible.
9. Suggested titles and captions need to be sent to Ashley with the tape.
10. Ashley will edit the final compilation version and reserves the right to make the final selection of case studies.

Accompanying Notes

1. Two sides of typed A4 would be the maximum for each contribution.
2. The first side should have a standard format:
   - Abstract : a brief summary of the lesson
   - Content : school and age/ability/background of pupils: how lesson fits into the geography curriculum; details of hardware, software used.
   - Lesson Plan : To include sections of the lesson, resources used, objectives (knowledge, skills, values) etc.
   - For the Teacher : Key questions and discussions points for teachers watching it.
3. The second side of notes to be organised by contributor and could include pros and cons of the strategy used; pupils work; way classroom arranged etc.

Deadline

Edited video to Ashley Kent with accompanying notes by DECEMBER 1ST 1987.

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of the IGU Commission on Geographical Education in Sitges in August 1986 with the original intention of including IT geography classroom material from around the world. With this in mind, the IGU Commission Newsletter encouraged possible contributors to contact the author. Unfortunately the response from beyond the U.K. was limited, so it was decided to make the exercise a U.K. contribution to the IGU Commission Meeting in Brisbane in August 1988. The author at this point wishes to place on record his gratitude for the comments of the British panel, an informal grouping of the IGU Commission on Geographical Education, chaired by Michael Naish, which it made at two meetings in 1987.

The video represents an 'opportunity' sample from the U.K. system in that it consists of those able to overcome the constraints of videoing in classrooms and indeed getting the permission to do so! The intention via the tapes and the accompanying notes is to give a realiable set of impressions (vignettes) of classroom processes. The eight case studies and their characteristics are portrayed on Fig. 2 and represent a range of classrooms in a variety of situations. The software used varies from early simulation type of CAL (TREASURE ISLANDS) to the most recent content-free simulations (FORUM), and context specific simulations (SANDHARVEST). It includes the latest videodisc technology (DOMESDAY and IVIS*) and data-handling software which allows the data to be mapped and analysed (GEOBASE AND CENSUS DATA BASE). Finally, it includes the relatively recent programming language of PROLOG and ways in which students

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* IVIS is the Interactive Video in Schools Project which has produced a geography disc

SOFTWARE USED	AGE OF STUDENTS	PART OF GEOGRAPHY COURSE	PUPIL ACTIVITIES	TEACHING STRATEGY
SANDHARVEST	14-15	Developing World - Sahel	Role-playing in groups; Decision Making Planning from different perspectives	Decision Making Simulation in groups
GEOBASE	10	Map Skills	Inputting coordinates to micro having planned island beforehand	Cooperation and map drawing in pairs
IVIS GEOGRAPHY DISC	14	Migration and Weather	Selecting resources from disc for own purposes. Role of TV presenters	Self-directed study and presentation
FORUM	13-15	Developing World - an E.African Game Park	In groups evaluating development/ conservation pressures in E. Africa	Decision Making in groups
DOMESDAY NATIONAL DISC	9-11	Conservation/ Pollution	Choosing 8/9 photos from the resource and adding text and questions - work in groups	Self-directed enquiry and presentation
TREASURE ISLANDS	12-13	Map Skills	Competitive adventure game simulation In groups of 4 - either pirates or treasure ship. Strategy and decision making	Discussion, strategic thinking and decision making in groups
PROLOG	17	Hydrology	Modelling slope drainage in PROLOG in pairs. In-depth thinking, programming and discussion	Modelling in pairs with teacher support
CENSUS DATA BASE	14/15	Urban Geography	Use of 1981 socio-economic data for London in groups: choosing, describing and explaining maps portraying this data; testing hypotheses based on data available	Group and individual work on hypothesis testing; description and explanation of computer-drawn maps

Fig. 2

can use it to learn to model in this case hydrological systems. The ages of the pupils involved varies from 9 to 17, and there is a wide variety of aspects of geography represented.

No further details are to be given here since it is necessary for the reader to view the video and read the accompanying notes which after all is the core of this project discussion. Concentrating on the teaching strategies represented here, it becomes possible to generalise across the eight case studies; firstly, pupils are rarely receiving formal lessons with the teacher supplying information; secondly, the majority of case studies involve small groups or individual work; thirdly, self-directed enquiry and autonomous learning is encouraged on several occasions, not least with DOMESDAY and IVIS where the pupils are encouraged to cope with a rich and complex data source; fourthly simulations, role plays and decision making are common activities; and finally and perhaps most important the students are frequently engaged in higher level cognitive and affective tasks since the software plays an emancipatory role, foregoing the need to undertake 'drudge' occupations such as data retrieval, map and graph drawing.

Conclusions

These video case studies suggest that IT in geography classrooms can be one way in which a modern enquiry-oriented, non-teacher directed/dominated classroom environment can be achieved. The relationship between teacher and pupil changes from one of dominance and subordinance to one of mutual and shared discovery. It illustrates clearly how IT in the geography classroom can act as a powerful catalyst to the emergence of simulation as a more central teaching strategy (Dickenson and Kent, 1988). The video also points to the distance IT in geography has travelled since the early days in the late nineteen-seventies when HURKLE and FARM were de rigeur! The project also points, the author hopes, to the teacher training value of classroom videotapes, and in particular that the IGU Geography Education Community could engage on a wider project in the compilation of classroom videos from the member countries and thereby encourage progressive pedagogy which should be at the root of all our endeavours!

Acknowledgements

The author wishes to thank the following coordinators of the individual videotapes: Steve Jefferys (SANDHARVEST); Gerry Hones (GEOBASE); David Walker and Julia Duckworth (IVIS); Sue Burkill (FORUM); Andrew Phillips (DOMESDAY); Bob Cummings (TREASURE ISLANDS); Terry Goble (PROLOG); and Mike Milton (CENSUS DATA BASE). They gave freely of their time and expertise, and the final video is due in large measure to them. The author also wishes to thank all the teachers and pupils who kindly agreed to be filmed and for the video to be used as a teacher training resource.

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STRATEGIES EMPLOYED IN INTRODUCING "CONTOUR" IN TEACHING SITUATIONS AND TEXTBOOKS

BY

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ABSTRACT

Understanding of the basic concept of contour is essential for students to interprete topographical maps effectively. In this paper, methods of introducing contour in two teaching situations (conventional and problem solving) and in textbooks were analysed. The analyses showed that introduction of "contour" in mapwork was generally inadequate. There were instances of no teaching at all. Observed teaching situations were generally theoretical. Introduction in the textbooks in as much as it involved models and experimentation lacked reality. The problem-solving teaching situation in which models were employed externalized misconception about horizontal dimension of contour from students. This misconception was concealed in the conventional teaching situation and ignored in textbooks. Incorporation of this horizontal dimension in textbooks as well as adequate education of teachers for teaching "contour forms" becomes necessary if students are expected to interprete topographical maps meaningfully.

INTRODUCTION

According to Graves (1975) a topographical map is after all a mass of embedded shapes made up of contour lines, features and symbols. Contour pattern produces the landform on which the features and symbols are located and also affect their location. "Contour" could therefore be argued to be the base of a topographical map. It is therefore necessary that the concept of contour be clearly understood if students would be required to read and interprete topographical maps effectively.

Interpretation of topographical maps poses problems to school certificate geography students. The chief examiners' and moderators' reports of the West African Examinations Council (WAEC) which examines school certificate candidates from Nigeria, Ghana, Liberia, Sierra Leone and The Gambia have indicated poor performance in Mapwork (WAEC, 1975, 1977, 1978, 1980, 1981, 1984). This problem seems to be internationally experienced as it featured in reports of school certificate (CSE and GCE O Level) geography examinations in Britain (Boardman, 1983). Information that many students were unable to locate and interprete simple contour forms was prominent in these reports from West Africa and Britain. If students find it difficult reading simple contour forms, it could be argued that they have not conceptualised contour lines and therefore cannot interprete topographical maps accurately.

Poor teaching has often been inferred to be the major reason for this poor conceptualization (Okoye 1975, Boardman, 1983). In this paper, an attempt would be made to analyse the strategies employed in introducing "contour" to school certificate students in Nigeria. Data for the analysis were obtained from teaching situations and textbooks.

FRAMEWORK FOR ANALYSES

Teaching Situations: The teaching situations (conventional and problem-solving)reported by Okpala (1987) were analysed. Okpala observed these teaching situations in an attempt to ascertain whether a change in pattern of questioning in West African School Certificate (WASC) examinations in mapwork would induce teachers to improve their teaching strategies. The design of the study was quasi-experimental. Cohorts of school certificate classes taught by 8 (same) teachers in two consecutive academic years (1984/85 and 1985/86) were involved.

In 1984/85 "contour" as normally introduced to students was observed. The teaching referred to as "conventional" prepared students for the type of school certificate questions quoted below:

> Mark clearly the extent of and indicate with the appropriate letter(s) given in the brackets over each area to which it refers, one example of each of the following: Waterfall (W); Even Slope (E); Level Crossing (CL);Bluff(B). Shade an area where the elevation is below 1800 feet (WAEC, 1975).
>
> Calculate the actual distance in kilometres as the crow flies from Mayo Selbe Rest House to trignometrical station at Kwenta (Walu) (WAEC, 1982).

Okpala (1987) criticized the above question type set by the WAEC as being inadequate because it is theoretical and lacks reality which Board (1967) and Ratajsk (1978) insist is the root of map information. She recommended problem-solving questions for WASC mapwork examination. The rationale behind this recommendation is the view held by educators (Morris, 1972; Marsden.1976; Lewy,1977) that the content of examinations determine what is taught and how it is taught in schools. Hence examinations could be used constructively for curricular reform.

During 1985/86 school year, Okpala (1987) structured a type of problem-solving questions termed "Reality Oriented Problem-Solving (ROPS). The 8 teachers involved in (1984/85) were asked to teach, assuming that their students would answer the ROPS question type in the WASC examination. In the ROPS pattern of questioning environmental issues whose solution require use of basic concepts in mapwork (examples: decision on location of routes and projects) are presented to students. Students cull up and use relevant concepts in solving the problems. An example is given below:

> The government of Nigeria has decided to build a road linking the NEILS VALLEY area to the major road which runs north to south through Naraguta Hausawa and Jos. The people living in NEILS VALLEY would like the route to extent straight into the valley due east from Naraguta Hausawa.
>
> You are the engineer in charge of advising the government on new routes. You feel that the direct link from Naraguta Hausawa to NEILS VALLEY is not possible.
>
> (i) Write out your brief explanation (based on evidence from the map) to the people in NEILS VALLEY why this direct link is not possible.
>
> (ii) Briefly describe the route which you would recommend and give your reasons. (Use sketches where necessary).
> (Okpala 1987, 511 - 512).

Textbooks. Strategies of introducing contour in textbook were analysed as these textbooks are meant to provide relevant experiences for understanding of basic concepts in mapwork. For example, Nimako (1982, iv) asserts that his book "takes the students through the basic rudiments and skills of map reading and the reading of sample topographical maps". The basic textbook analysed was Map Reading For West Africa (Nimako, 1982). Supplementary texts were Map Reading For West African Schools (Wareham, 1975) and Understanding Contours and Landforms (West and Rose, 1976).

ANALYSES OF STRATEGIES

Conventional Teaching Situation

In the conventional teaching situation three teaching strategies employed were: (i) No introduction of contour (ii) Contour Introduced (iii) Students read up contour as an assignment. The frequencies of teachers who adopted the different strategies were 3,4 and 1 respectively. The details of the strategies are reported below.

No Introduction of Contour: Students read the text on Mapwork in readiness for any topic which would be taught. They learnt to recognize contour lines and forms as the topics (Factors affecting communications, Interpretation of topographical maps, Relief and Communication) were taught.

Contour Introduced: Teachers who introduced contour taught it through mere definition as "a line joining places of equal height". Illustrations of various contour forms then followed. Towards the end of the lesson students practised identifying landforms on either topographical sheets or maps in the main text.

Assignment: In this strategy, the teacher instructed the students to read up Representation of Relief Features before the lesson. During the lesson, the teacher tested students' knowledge of contour forms by demanding written answers to the following questions.

i. List 6 methods of representing relief on a map.
ii. Draw contour lines showing: conical peak, saddle, spur, valley, gorge, ridge, watershed.

Teacher went round and marked the answers. This test was followed by the usual practice of identifying landforms on topographical sheets.

Problem-Solving Teaching Situation

There was not much difference in strategies employed in introducing contour in the problem-solving teaching situation as compared to the conventional. The teaching strategies observed were (i) No Introduction of Contour (ii) Contour Introduced as in the conventional situation (iii) Use of Models. The frequency of the teachers who employed the different strategies were 3, 3 and 2 respectively.

No Introduction of Contour: The three teachers who used this strategy in the conventional situation maintained it .

Contour Introduced: Contour as taught in the conventional situation was maintained by 2 out of the 4 teachers. The teacher who used 'assignment' in the conventional situation this time introduced contour.

Models: Two teachers who introduced contour in the conventional teaching situation, in this approach, used models (one, an anthill and the other a model of a hill). The models, as exemplified in Figure 1 contained miniature physical features such as gentle (G) and steep slope (S), and plateau (P) which were identified and discussed in relation to transport, settlement and road construction.

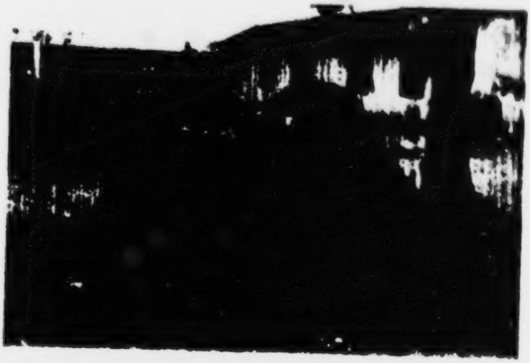

Figure 1: An Anthill - A Resource for Introducing Contour

In using the anthill as a resource "contour" was not introduced by definition at the beginning of the lesson as in the conventional teaching. Rather, there was a discussion on meaning of relief features with examples from Nigeria. This was followed by a discussion on the need for representing relief and culminated in introduction of contour form. Students had practical experience of measuring contour intervals (30 cm) with the foot of the anthill as the sea level (0cm) and joined places of equal height. They produced maps of the contoured hill exemplified in Figure 2.

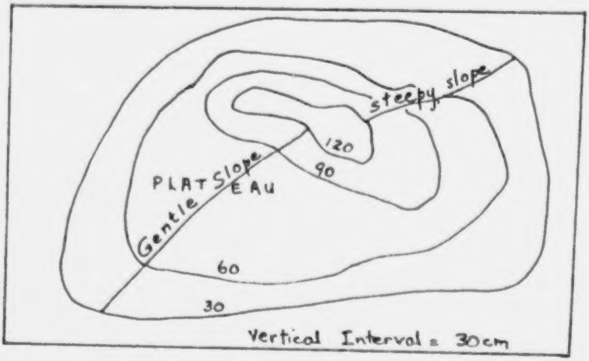

Figure 2: Map of the contoured anthill drawn by a student.

As could be seen in Figure 2, students were able to identify features existing on the anthill on the map. Nevertheless, the question posed to the teachers by students about contour spacing reveals the existence of some concealed conceptual vacuum. One example is reported below:

T: What is the difference between here and here (pointing at the steeper and gentle slopes)?
S: Here (pointing) is not as steep as here (pointing).
T: Do you agree with him?
Ss: Yes.
T: Now, how do you draw the contour lines?
AS: The contour lines here will be closer than here pointing.
AS: Excuse me ma. Why is the contour...?
T: Go on.
SS: I mean, here to here and here to here (pointing at the steeper and gentler slopes to the top) are the same.
T: Yes, they are the same height. But here is steeper than here (pointing). Therefore the contour lines of here should be closer than that.
SS. Ma, but they are the same height.

T: Yes but one is steeper than the other. Therefore the steeper the slope the closer the contour.

(T - Teacher; S - Student; Ss - Students; AS - Another Student; SS - Same Student)

Okpala 1987, 362.

In the above interaction, the SS could not understand why contour lines on the steep slope should be closer than in the gentle slope as the height of the land is the same.

Teaching in Textbooks: The teaching adopted in the textbooks (Nimako, 1982; Wareham 1975; Rose and West 1976) is the usual water experiment performed to illustrate contour lines using large square plastic container, water, a model and a marker.

DISCUSSION AND SUGGESTIONS

The report of teaching strategies employed in introducing "contour" reveal lack of: teaching of the concept, reality and consideration of the relevant dimensions of contour form.

The results obtained showed that in both the conventional and problem-solving teaching situations, 3 of 8 (38%) teachers (same teachers) did not introduce contour to the learners. While it is not certain why these teachers did not introduce the concept it could be inferred that they lack the necessary skills for teaching. Information elicited from teachers on why students find mapwork difficult placed "Lack of teaching skills" at the top of teacher variables and 3rd of 8 overall factors after "Problem of Mathematics" and "Students' Negative Attitude" (Okpala, 1987, 164-165). The above explanation could be true also for teachers who merely defined contour or used assignment method.

Teachers' unsatisfactory feedback to students' questions on contour spacing reveal lack of understanding of the horizontal dimension of contour form by the teachers. The vertical (height) was taught while the horizontal dimension which determines the complexities of the contour form was ignored.

Introduction of contour forms in several books in and outside West Africa (Wareham, 1975; West and Rose, 1976; Reed, 1981; Nimako, 1982; Turk, 1983; Boardman, 1985) also ignore this horizontal dimension.

In introducing "contour form" the vertical and horizontal dimensions should be practically demonstrated using realistic models and suitable objects before the map is drawn. An example of a recommended procedure is given below with an overturned bowl of a kitchen scale.

1. Find height of the hill overturned bowl 7cm
2. Determine the contour interval (1cm). There would be 7 intervals from the foot of the hill to x.
3. Insert 7 points (x inclusive) in various directions paying attention to directions with outstanding features, e.g., A B C D.
4. Join the dots

The product of the above activity is shown in Figure 3.

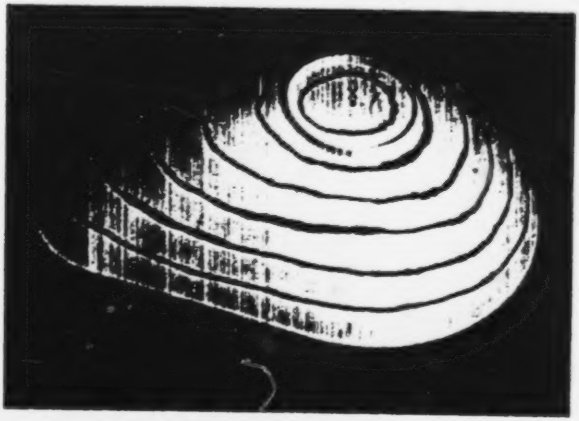

Figure 3: Concentric circles marked at equal intervals on an overturned bowl (hill).

Practicals with objects and models containing various recognizable features (e.g., valley, plateau, steep and gentle slopes) using the above procedure would facilitate understanding of the concept of contour.

Realistic models used by the two teachers must have contributed in externalizing the misconception about horizontal dimension, as students were provided the opportunity to think and talk. Reality should therefore be built into even introductory lessons on contour. For instance the overturned bowl could be assumed to be a hill on which a broadcast mast will be installed. A realistic problem could be producing a map of the hill to indicate to the route to the top.

CONCLUSION

Interpretation of "contour forms is a problem not only to Nigerian students but also to the British. This report has shown that "contour" is not appropriately introduced to Nigerian students as teachers and writers of textbooks fail to emphasize the "horizontal dimension". It therefore becomes necessary that research on strategies of introducing contour be done in other countries, as graphicacy is an important aspect of education. There is need for proper education of trainee teachers and for retraining of practising teachers on appropriate methods of introducing "contour" in mapwork in schools.

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INTEGRATED COURSEWARE FOR INSTRUCTION IN PHYSICAL GEOGRAPHY AND PHYSICAL GEOLOGY: COMPUTER SIMULATIONS AND EXERCISES FOR STUDYING ENVIRONMENTAL DYNAMICS AND GEOGRAPHIC DISTRIBUTIONS

David M. Sharpe and Lawrence L. Malinconico, Jr.

ABSTRACT

Instructors in geography and geology generally do not use computer-assisted instruction in their undergraduate courses. A major reason for this in North America is the lack of appropriate and readily available software. A team of faculty and computer programmers at Southern Illinois University is addressing this need by developing an integrated series of programs and laboratory exercises - courseware - to be used in Physical Geology and Physical Geography. The programs are graphically-oriented, and designed to simulate environmental systems. Use of instructional software gives important benefits to students. Simulations help students to develop research skills and learning strategies that are important in their academic development. Also, students develop computer skills that are increasingly important in their professions.

INTRODUCTION

The ostensible goal of introductory physical geography and physical geology/earth science courses is to teach students to investigate the dynamic and interacting systems of the earth. Since many of these systems are not amenable to direct observation because of their size, compexity, and time frame, faculty as researchers often use computer simulations to study them. However, in spite of the revolution in personal computers and investment by colleges and universities, computer-aided instruction (CAI) that emphasizes simulations is not widely used in introductory courses.

One might argue that simulations are an unnecessary instructional tool, and that the students can learn about the dynamic earth from texts, lectures and laboratory sessions. However, the graphs and tables in texts cannot convey dynamics adequately, and laboratory manuals tend to stress terminology, identification, and classification at the expense of dynamics of the earth's systems. Currently, instructors are limited to *describing* the facts of the earth's dynamics because they have poor resources to *demonstrate* these dynamics. The capability that instructors have in their research has not trickled down to the classroom or the instructional laboratory. In short, the most powerful tool available to faculty as researchers is virtually ignored by faculty as instructors.

At Southern Illinois University, we are developing software for a sequence of topics typical of introductory physical geography and physical geology courses, as shown in Table 1. These two subjects have a number of topics in common, so that the programs are serving double duty, even though the exercises differ to take account of different emphases and perspectives of each discipline.

All of the programs have a similar menu-driven interface. Thus once the users (students or instructor) learn how to use one program, they know how to use all of the programs. More time can be spent learning *from* the software rather than learning *about* the computer. The programs are graphically-oriented, designed to simulate environmental systems which the user can use to examine concepts. Several of the programs contain game-like exercises which seem to increase the student's interest while continuing to demonstrate concepts. To carry the process one step further, we are developing a completely integrated series of programs and exercise manuals- courseware - to be used in introductory-level Physical Geology and Physical Geography laboratories. The term "courseware" has recently become a catchword, applied to any software that is used in a classroom situation. We restrict "courseware" to a much more complete package that addresses the concerns mentioned above. This includes a comprehensive set of software covering the range of subjects taught in a single course, and perhaps more importantly, a set of exercises to accompany the software.

TABLE 1. MODULES FOR INTRODUCTORY COURSES IN PHYSICAL GEOLOGY/EARTH SCIENCE AND PHYSICAL GEOGRAPHY

TOPIC	PHYSICAL GEOLOGY	PHYSICAL GEOGRAPHY
Weather and Climate		
Earth-Sun Relations - Season, latitude, tilt of axis		x
Electromagnetic Spectrum - Radiation vs. temperature		x
Energy Budget - Energy exchanges at surfaces		x
Humidity - Temperature vs. atmospheric moisture		x
Atmospheric Circulation		x
Local Water Cycle - precipitation, soil moisture, runoff		x
Climate Classification		x
Biospheric Processes		
Ecologic Energetics		x
Soil - Soil Types		x
Solid Earth Processes		
Earthquakes - How to locate seismic events	x	x
Plate Tectonics - Reconstructing Pangaea	x	x
Plate Tectonics - Plate Margin Processes	x	x
Surficial Processes		
Groundwater - Flow rates, pumping effects	x	x
Shoreline - Waves and transport processes	x	x
Rivers - Cross-sections and meanders	x	x
Earth Materials		
Rocks and Minerals - Identifying and classifying	x	
Stratigraphy - Relative age of rocks	x	
Stratigraphy - Stratigraphic record from cores	x	
Managing Resources		
Earth Resources - Exploration of economic deposits	x	
Soil Management - Universal Soil Loss Equation		x

THE PROBLEM

There are a number of reasons that the computer is an underutilized classroom tool. Among these is the lack of computer facilities, faculty infamiliarity with computer technology and its potential for improving the learning experience, a shortage of effective software, and, perhaps most importantly, the lack of a complete package that integrates the software into class and laboratory work.

There are two facets to this latter problem. 1. There has yet to be a set of software developed and compiled that covers all of the topics relevant to a physical geography or physical geology course. It would be possible for an instructor to search the many sources of computer software and find a program developed for many of the topics taught. However, because of the many different sources, the instructor would find that: a) the programs and documentation would be of highly variable quality; b) each of the programs will run differently and interact with the user in a different manner; c) the programs may have different hardware requirements. 2. While there may be software available, there will not be exercises developed which guide the student through the most effective use of the software.

This imposes a number of impediments to introducing computer-assisted instruction. The instructor must learn how each program runs, then develop the exercises which will accompany the programs. He/she then has to teach the students how to use each program. The result is that most instructors decide not to use the software or to use only a small fraction of the available software because of the costs of effectively incorporating it into the curriculum.

Desirable Attributes of Instructional Simulations

A number of authors have commented on the desirable attributes of computer programs designed for use in education. We emphasize three attributes; the algorithms that drive the calculations, the user/computer interface, and structure of the programs. Each deserves a brief explanation.

1. Algorithms - Rarely is there one, and only one, set of equations to represent a relationship between two or more variables. The thrust of much research on environmental systems is to define and refine understanding of these

relationships, and to report them in the literature. Therefore, a number of algorithms are usually available, and the task is to select the algorithm that fulfills two sometimes opposing criteria. On the one hand, it must not be viewed as naive by the expert. On the other, it must be parsimonious so that processing time by the computer is minimized. This is especially important in interactive programming, since a 10 second wait for the computer to respond seems like an eternity to a student.

2. **User/Machine Interaction** - The algorithms are the basis for computer simulations. However, they should be transparent to the student in an introductory course, who deals with graphic representations of the system, not with the equations used to quantify it. Development of the protocol for student/machine interaction represents a number of other challenges, and consumes the majority of the effort in creating an instructional simulation.

The "look and feel" of the computer is all-important in an instructional setting. Students frequently are struggling with their own inexperience with computers, and perhaps with feelings of incompetence, as well as with the mysteries of the subject matter of the course. Therefore, students must be able to shift their attention away from the intricacies of operating the computer to the pedogogic issues of the program. There are many components to user/machine interaction, but we stress simplicity of menu structure, clearly defined menu choices, with brief elaborations at the top of the screen, and graphics that reinforce the information being presented.

We believe that programs should be nearly self-explanatory. Few faculty read user's manuals before using a program. Students are even less inclined to do it; user's manuals are as much a mystery as are computers. Therefore, students should be able to work with a program after rudimentary instructions by the instructor. First, the menu structure needs to be explicit, and uncluttered. Figure 1 shows the menu structure for the program SUNPATH, which is a program that helps students understand how the sun's path and solar energy vary with season, latitude, and tilt of the earth's axis. This program can be operated by selecting an operation, e.g. **Change Date**, then using thge Up/Down arrows on the microcomputer to make the desired change in date. Having selected the desired conditions, the student can observe the sunpath being drawn for a twenty-four hour period (**Time, Auto**), or advance time by one hour increments (**Time, Manual**)

Second, the command structure should be simple. All necesssary commands can be entered through three keys, the Up arrow, Down arrow, and Enter or Return. Generally, we avoid alpha/ numeric inputs, except in cases where the student or instructor can create new data files.

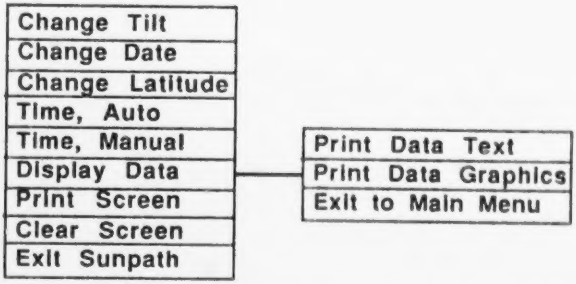
Change Tilt
Change Date
Change Latitude
Time, Auto
Time, Manual
Display Data
Print Screen
Clear Screen
Exit Sunpath
Print Data Text
Print Data Graphics
Exit to Main Menu

Figure 1. Menu structure for SUNPATH, showing the main menu on the left and the second-order menu on the right that appears when Display Data is highlighted and the Return key is pressed.

Third, the program should have exhaustive error trapping so that the student cannot undo the progress that he/she has already made in the lesson through an inadvertent key stroke. Listen to the sounds in any university microcomputer laboratory. There is a cacophony of "beeps" signalling wrong key strokes. Students need to be protected from themselves. Each beep reassures the student that he cannot make a fatal error, and instills greater confidence. Each failure to beep is a setback to the instructional goals of the course.

Fourth, the sequence of graphics on the screen is all important. In contrast to students, professionals have developed analytic skills through many years of experience. We are accustomed to dealing with environmental systems through tables and graphs. These tell us about system states and dynamics, which we then use to conjure up mental images of the system. We move from data which we ourselves may have obtained, to results of computer analysis, to the mental images that encapsulate our understanding of the system. The dilemma for students is that instructors present them with static and highly abstract representations of systems as tables, graphs and diagrams, which students are required to transform into a synthetic understanding of the dynamic and interactive nature of environmental systems. Experience with the real system may be the most fruitful way to acquire this understanding in some cases, but most environmental systems are too large, too slow, too inaccessible, or too dangerous for direct observation. Well-designed graphics that help them to see behind tables and graphs is a practical alternative.

Figure 2 shows a screen from QUAKE, a program that is used to study the geographic distribution of earthquakes and the methods to locate earthquakes. In this example, earthquakes for 1984 were plotted. The locations of seafloor spreading and the subduction zones are strikingly shown by the patterns of earthquakes. The distribution of shallow, intermediate, and deep earthquakes in subduction zones, in contrast to the shallow earthquakes in regions of seafloor spreading, leads students to a better understanding of these processes of plate tectonics. Alternatively, students might focus on any selected region, select earthquakes of selected magnitudes or depths, or use different data bases to map major historic earthquakes. In each case, the graphics have been designed to be clear and uncluttered.

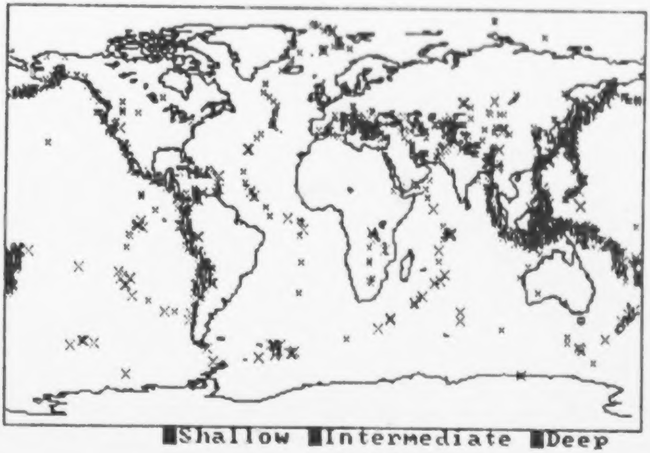

Figure 2. Screen display for QUAKE, showing distribution of earthquakes for January - June, 1984. Size of the X is related to earthquake magnitude. Overlapping Xs show regions of major tectonic activity.

3. Open-Endedness - Simulations provide an efficient tool for exploring the dynamics of a relationship, if designed properly. An important goal is to provide the student with wide latitude to learn through taking the initiative in exploring these dynamics. In effect, we are designing research tools for students, and believe that student-initiated research is the most powerful form of self-education (Adolf 1968; Peterson et al. 1987). We try to design a simulation that can be used by the introductory student, but is also comprehensive enough to give an advanced student new insights into the system being simulated. One example is the command Change Tilt in SUNPATH (see Figure 1). This allows the sun's path to be simulated for tilts of the earth's axis from 0° to 90°, and the resulting solar energy inputs to be calculated. The ease of changing the tilt angle facilitates comparing a number of tilts.

Exercises and Manuals

The objective of exercises is to provide the guidance that most students need to undertake these experiments, and to formalize and interpret results. Each program can be the basis for many exercises which explore a number of concepts that are incorporated into the program. By providing the courseware package with a number of exercises for each program we make it possible for the simulations to be used by instructors who would otherwise not have time to develop the required exercises. However, the open-endedness of the simulations provides the imaginative instructor with many options beyond the specific exercises. Also, we encourage students to use the simulations to explore concepts that are not covered explictly in the exercises.

ORGANIZING FOR SOFTWARE DEVELOPMENT

The university is the best place to develop instructional software. It is also the worst. Generally, the full array of expertise needed to develop software is present in a university. Generally, also, the expertise is so isolated by the boundaries established by university structure and competing demands on faculty time. The challenge in the university is to bring these skills together long enough to get the job done.

At Southern Illinois University at Carbondale, we established the Environmental Simulations Laboratory, through a grant from the U. S. Department of Education, Fund for the Improvement of Postsecondary Education. Faculty in geography and geology departments work with programmers in developing the programs. This team approach to development assures high quality in subject matter and program design.

The software development team goes through several steps in producing a specific piece of software. This design sequence (Alessi and Trollip 1985) invokes the skills of each of the team members. Starting with definition of the purpose of the software, which emphasizes pedogogic objectives, we collect the relevant information (e.g., algorithms for the simulation), then generate and organize a number of alternative strategies for simulating and displaying the information, in a process called "brain-storming." We then plan all screen displays, including the organization and placement of menus, and graphic and digital displays. Only after this stage does programming begin. Finally, we go through a prolonged process of evaluation of the software and exercises, which involves use of the program by students in courses at Southern Illinois University and other institutions, and review by faculty.

GENERAL OBSERVATIONS

We feel that the use of instructional software provides important benefits to the students. Simulation programs allow students to develop research skills and strategies that will be important in their future academic and professional development. It also exposes the students to a technique and a tool, the PC itself, that will be widely used in their professional careers. By expanding the concept of courseware to include predeveloped exercises, we hope to encourage the use of the simulations by instructors who might not otherwise have the time or inclination to incorporate software into their curriculum.

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Developing learners' skills and abilities in geography

SCHOOL MAP COMPILATION IN CHINA

(Abstracts)

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School map is a self-contained geographical teaching material in the form of cartographic representation to fulfill the task of geographical education jointly with textbook. The features which distinguish school map from other maps is that, according to the requirement of geographical education, it rationally condenses the geographical information which is to be shown, while making emphasis on different subjects and focal points in different structures and levels.

The development of modern science and technology makes it possible to apply medium of electrified education, adding new functions to the school map to acquire the best effect in geographical education. In China, a fairly long period of time is needed to achieve the modernization of geographical education, and the custom shool map takes the dominance for the time being.

The school map compilation in China has always been undertaken by the cartographers. Thus it is quite necessary to promote the integration of map compilation and geographical education, and to improve the connections between cartographer and geographical teacher. School map must reflect in time new things in the field of geography, but unlike newspapers and magazines, teaching material can only be updated regularly, while the important geographical information can be edited as a supplement to the teaching material.

Since the founding of New China, a considerable progress in school mapping has been made over the past nearly forty years to support geographical education. More than 100 titles of school wall map have been compiled,4 titles of school atlas and 8 titles of school blank atlas have been published and distributed to students along with textbooks. The distribution reaches 100 million copies a year, ranking the highest of the world.

SCHOOL MAP COMPILATION IN CHINA

Chen Chao
China Cartographic Publishing House
Beijing, China

In the begining of 1920's, school map emerged in China, since then it developed along with the setting up of geographical course in schools. Past experience of eighty years has proved that the purpose of geographical education could not be fully accomplished without the aid of school map.

The aim of school map is to support textbook with its unique features of vividness and visualizationin to help students in building up the geographical spatial concepts, improving the ability of spatial observation and imagination, promoting the creative ability of geographical association, thus students will be able to get a deep impression of geography from school map. Moreover, it can be used both for understanding macrocosm and aquiring varied information. Therefore, school map, especially middle and primary school map compiled under the "Geographical Teaching Syllabus", is not only the "appendage" and "intuitional teaching aid" for geographical textbook, but also an important part of the three systems of teaching material (textbook, picture and assignment), a self-contained geographical teaching material in the form of the cartographic representation. It coordinated with textbook in geographical education, performing their own functions.

Different from other types of map, school map features that it is compiled exclusively for geographical education in different levels and for different purposes of various kinds of school. The geographical elements of school atlas should be generalized to stress the main points with the aid of dynamic analysis like graphics, statistics and geographical landscape pictures. For wall map which is shown in geographical class, thick lines, large symbols, bold letters and clear colour contrast are adopted to attain a satisfactory visual effect in the classroom. This kind of simplicity and roughness is by no means an unscientific, arbitrary description of the geographical information, it is the enlargement of reasonably condensed information. Various kinds of map product which serve as extra-curricular readings of geographical education should also be designed and compiled on the basis of instructional program. In fact, school map is one of the product incarnating the combination of the nature of geography and pedagogy. Its compilation process involves the knowledge of cartography, geography, pedagogy, psychology and aesthetics, etc. Hence, to improve the quality of school map, it is essential to carry out special studies on this subject. The School Map Research Group of Research Association on Geographical Education under China Educational Society, is going to organize a series of academic activities in this field.

According to the general requirement for geographical education proposed by the system of universal compulsory education, and according to the level of the school and the age of the student, school map should be varied in its cartographic representation and content comprehensiveness, so as to get the best effect of teaching. In each stage of teaching, attentions should be paid not only to keep the continuity of subject from the easy to the difficult, and to show the interactive relationship between the teaching contents of related disciplines, but also to reflect the features of school map on different levels. In primary school, geography is taught in the 4th, 5th and 6th years with 64 teaching periods*,mainly on elementary knowledge, by which children can get initial ideas about their hometown, their motherland and the world they live on. Thus school map for this level should make the stress clear and simple, the content be vivid and attractive, and the map representation should emphasize on images which can be directly perceived, passing from concrete objects to abstract lines and symbols, endeavor to raise the students' interest and lead them to understand map through geographical knowledge, and in turn to strengthen these knowledge through map. In the 1st and 2nd years of lower secondary school, elementary knowledge and theory of geography are taught systematically in 160 teaching periods. Here students learn various subjects of geography, acquire the ability of comprehensive reasoning, the capacity of using various maps and the general skill of map drawing.This give rise to the compilation of maps which must fulfil the above-mentioned requirement. In upper secondary school, geographical courses are given in 64 teaching periods, dealing with the elementary theory of earth sciences, such as man's relationship with the nature, the stratified structure of the earth, the movement of the earth, geographical environment, etc., much more subjects are involved. In this way school atlas for this level should be coherent in the arrangement of maps, with the effective support of graphics and large amount of thematic maps to reflect the complicated geographical phenomena. In a word, school maps at each level must have their unique features to perform their own functions.

Modern scientific and technological development makes it possible for schools to apply advanced teaching method like electrified education, etc., thus adds new functions to school map in acquiring the best effect of geographical education. We are glad to see that these advanced media of electrified education like slide projector, overhead projector, cassette recorder and computer, though limitedly for the time being, are beginning to be used in large cities of China. The development of education in China is extremely uneven, the education in the vast remote areas of countryside is much less developed, so it will take a rather long period of time to realize the modernization the teaching method of geography, and the paper-made, custom plane map is unlikely to be replaced by the medium of electrified education in the near future.

Unlike the editing of textbook, map compiling has its own characteristics: normally it is undertaken by the cartographer who, lacking experiences of geographical teaching, has inevitably limitations in reflecting the demands of the instructional program and to fully endow the map with the instructional function. It is thus indispensable for cartographer to strengthen his connections with the society and educational circles, such as the experimental using of map in school before publishing; exchanging opinions with geographical teachers on map products and collecting information on response of teaching practice; observing the instructional effect of map by directly attending the class; and, when condition permits, adopting certain experienced geographical teacher in the compiling work.

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* 1 teaching period in China is fourty five minutes.

Above all, it is absolutely necessary to promote the integration of school mapping with geographical teaching on the basis of the specific condition in China.

The geographical environment is constantly changing, and the teaching method of geography is also improved frequently along with the progress of science and technology. One of the major task of school map is to reflect in time the new geographical phenomena and concepts: man's achievements in exploiting and renovating nature; development of production and economic construction; new changes of the category of human geography; utilization of the achievements in geographical research, etc. Considering the difference between textbook and newspaper or magazine, that the content of a map should be relatively stable, it is appropriate to treat the current information for map updating in different ways, i.e. for important and principal information, revise promptly(e.g. once every year), for general information, revise regularly(e.g. once in 2-3 years). If there are significant changes in the instructional program or textbook, then the map should be accordingly revised or re-compiled. Also, it is an effective way to introduce and report the geographical information timely to geographical teachers on geographical teaching journals or through other ways.

School map compiling of New China has gained significant achievements in nearly forty years' service for geographical education. Up to now, more than 100 titles of school wall map(not including historical school maps) have been compiled and published for teaching on the class; besides, there are 4 titles of school atlas and 8 titles of blank atlas which goes with textbooks to every student every year. These atlases, totalling more than 100 million copies in print runs, rank the highest number in the world. In the future, aside from increasing the print runs, international communiction on ideas of school mapmaking should also be strengthened, and quality of school maps should be raised, the types and forms be varied.

MAPPING SKILLS REQUIRED BY GEOGRAPHY STUDENTS TAKING THE GENERAL CERTIFICATE OF EDUCATION AT ADVANCED LEVEL

David Cooper

Abstract:

Mapping skills are regarded as basic to sound geographical training. The paper discuss how successfully these are applied and tested in the English and Welsh Examinations at this level.

Introduction

Geographers use maps as a basic tool of their science. the interpretation of the signs, symbols and patterns thereon as their contribution to science and thus to knowledge. Maps convey symbolically what otherwise would require many words, maps store information, their message is conveyed quickly and their basic symbolism is widely understood. These Geography students, most of whom are in the 16-18 years age range should be well conversant with maps, have developed some more advanced mapping skills, be capable of applying these skills effectively in both course-work and examination. The paper sets out to discuss how they are tested in examination and relates the author's experiences as an examiner at this level, these suggest that all is not well.

Background:

The development of spatial awareness and map-skills commences about age 8 and is continued through formal education, normally in the Geography class until the age 16. Simon Catling has shown (Catling, 1978, 120) that it begins with cognitive mapping of the home, local and school areas and is then developed towards an understanding of the more abstract geometric map forms. H.A. Sandford (Sandford 1986, 22) presented an "all through" map work curriculum from age 5-18, using behavioural objectives divided broadly into map making and map using. The first formal external test of map skills is the 16+ examinations, until 1987 the General Certificate of Education (GCE) Ordinary Level (O-level) or Certificate of Secondary Education (CSE) now replaced by the single General Certificate of Secondary Education (GCSE). Two levels of skill are tested, the derivation of information by use of map references, latitude and longitude, recognition of conventional signs and colouration and the application of this information into simple interpretation. Map-work centres around the Ordnance Survey map but students are expected to use Atlases and to understand the principles of thematic mapping. These skills are paralleled by the development of motor skills in drawing sketch maps, sections and transects.

GCE Advanced Level (A-level) represents two further years of Geographical study, along with two and occasionally three other subjects, to the same level. Whilst this is primarily a text-based course, the books are illustrated copiously with maps and the Examination Boards who organise the A-level examinations exhort teachers to use topographical and thematic maps to illustrate their teaching, and to use maps in the field. Most Boards encourage further use of maps by students who undertake project work instead of a written paper, whilst the rubric of every question paper asks for graphic illustration of answers. The Boards have moved away from compulsory map-based questions but mapped data and mapped materials form part of most examination question papers. The majority of Boards set one Ordnance Survey or similar map exercise as part of the assessment, but increasing costs have reduced the map from a full sheet to a "bleeding quarter." The map is of either 1:25,000 or 1:50,000 scale, either a normal topographic or a special tourist edition; occassionally a Land Utilisation map from Professor Coleman's Second Land Use survey is used. The first time that the candidates know what maps are being used is when they see the examinations papers.

THE EXAMINER'S APPROACH:

The GCE A-level system tends to divide into setters, a small group one or two for each paper in a two or three paper examination and markers a larger team responsible for assessing the actual performance. Collectively and strictly these are the examiners but for the purposes of this paper examiner means the setter who normally also prepares the assessment scheme.

Every setter faces the problem of how much material, in addition to the questions can a candidate successfully assimilate during an examination and under examination conditions. Whilst it is comparatively easy to limit the number of graphs, quotations and tables in any paper, it would appear that there has been no research on the up-take of data from thematic and topographic maps under these conditions. There is some evidence from the patterns of questions attempted to suggest that teachers may recommend avoidance of questions with graphic stimuli, where alternative approaches to questioning are found on the same paper.

The content of a well drawn thematic map may be absorbed in a minute or so by someone fairly familiar with the main facts behind the data shown. This is little more than the time needed to begin organising the answer, however experience shows that candidates underperform for a number of reasons. Errors of interpretation occur from misreading keys or titles, or from seeing what is a vaguely familiar pattern and failing to read the associated question properly. No examiner is perfect and what looked a perfectly good map at the setting stage may become over complex on the day! When the Examing Boards set a separate topographic map interpretation paper it was of an hour or hour and a quarter duration, and advice was given not to write anything in the first fifteen minutes. The questions which were then set attempted the synthesis of physical and human geography or at least sought the candidate's interpretation of their interaction. Now the topographic map has tended to become an optional question topic within a paper where three or four questions are attempted and the time allotted to any one answer is not more than fifty minutes. During this time the map has to be interpreted, the answer formulated and written. To allow for this either the question must be highly structured and focussed or it may be a comparatively "soft" question to allow up to ten minutes for reading the map. This may lead to criticism of the question as being less demanding than others on the same paper.

To counter this criticism supplementary material may be provided. This has included sketch diagrams, overlays of geology and of soils, bathymetry of coastal waters. The teachers' response, ostentially on behalf of their pupils, was to ask that this be stopped as it made for confusion with too much material.

The Examiner must also recognise that the map-work question may not be the first to be attempted. Recognising that it may take rather longer than a straightforward essay or a topic which the candidate thinks is better known, the question may be third or fourth choice. Discussion with students entering post-A-level Geography courses at Luton College of Higher Education suggests also that there is little formal topographic map-work going on in schools, the teachers explain this as a consequence of crowded syllabuses and map work having already been tested. The evidence shows that where the map-work question can be avoided many students will and with maps becoming more expensive to buy this has become something of a downward spiral. (The Oxford Delegacy of Local Examinations has temporarily stopped using Ordnance Survey maps at A-level).

There is no uniformity between the Examination Boards in their approach to map-work questions. This is no handicap since, unless they change school or college students follow one Board's syllabus in preparation. For example the University of London examination tests map work by one or two questions set amongst twelve from which the candidates answer six in two and a half hours. The Oxford Locals paper had either a question amongst ten on its physical geography paper or on the human geography alternating from year to year.

The London approach results in highly structured questions, with each part worth between 2 and 6 marks in a total of 25. The questions test both lower levels of skill such as giving references and reading contours as well as calling for application in the interpretation of the map for example in looking at site, and function of settlement. The Oxford approach in physical geography tended to be more open-ended. In 1986 candidates were given an extract from O.S. of Northern Ireland map containing coastal features of cliffs and sand spits together with a large area of drumlins and were asked to "Describe and explain the probable origins of the geomorphological features shown in the accompanying map extract". The previous year the candidates were asked (i) describe the settlement pattern of the area shown; (ii) suggest, giving map evidence, how the settlement pattern evolved.

Expectations must be quite different. The London examiners will have marked point by point probably demanding a high degree of accuracy and well developed short explanations to score highly. The Oxford approach requires the candidates to study the map, to recognise features without the help of "clues", draw from their memory about how such features were formed and to then write. The marks are there for recognition, description and for explanation.

Candidates' Response:

Although each candidate sits the paper as an individual their response tends across the total entry for the papers to be a collective one. Individuals may stand out at either end of the mark spectrum but there will be homogeneity in the mass near the middle.

Erroneous interpretation of thematic maps has already been mentioned. The use of a map showing epicentres of earthquakes in the North Atlantic region between 1962 - 1980, concentrating on the Mid-Atlantic Ridge and Iceland but with isolated events in Britain and North America produced far too many answers treating them as volcanic eruptions for comfort. The explanation may be nerves coupled with previous coaching. Similarly when asked to make a sketch of the meteorological conditions over north-west Europe, given the basic synoptic information very few can include all that was asked for, and more than one represented a deep depression by a single closed isobar. Weather systems are studied for A-level and ignorance of their representation is concerning. Over-full syllabus is not enough, poor teaching is also unlikely. Topographic maps receive a partial approach from many, concentrating their response on part of the map rather than the whole. There is also a tendency to answer a previous year's question rather than the one set, particularly amongst the weaker candidates. Thus the coast and drumlins map received many partial answers which could not score much more than half marks at best. There is still a mistaken view amongst some schools that all the information that goes into answering a map-work question relating with a topographic map must come from the map, this is both restrictive and penalising. It is not the same as extracting the greatest possible information from the map; G.H. Dury's Map Interpretation (Drury 1972) ought to have ended that, certainly there have been many texts subsequently that should have done so. Although there is ample evidence from project work and elsewhere that students in this age group enjoy making maps there is marked reluctance to use sketch maps in the examination. This is so even in the surviving regional geography papers as well as in physical and human. The most frequent sketch maps in physical the "formation of an ox-bow lake" whilst Burgess' or von Thunen's concentric rings or sometimes Christaller's lattices appear on the human answer sheet.

The making of maps in the examination is not seen as an aide-memoire to bring more from the depths of memory, but as a waste of time requiring a change of tempo.

Solution:

Professor WGV Balchin has often claimed that Graphicacy is a major geographical skill (Balchin 1972, 1976). Encouragement of graphic awareness must be developed. Map training should not be neglected because there is not a compulsory question; the Examination Boards might learn from the Scottish Examination Board and move from the physical-human division to the man-environment approach. The matter of satellite imagery is high on the agenda, some have the appearance of photographs, more are synthesised and require a mapping approach.

The Examiners have to determine an approach to map-skills by testing that recognises the higher levels of application and interpretation. Maps should be seen not jsut as an illustration but as an interpretative tool in geographical analysis. Questions should be structured to encourage the use of maps sketched by the candidatess, Examination papers often tend to favour factual recall rather than skills, the balance can be shifted without invalidating the rigour of the examination. Texts such as Thematic Maps Cuff and Mattson (1982) should find a place on teachers shelves alongside field work and numerical techniques books.

Conclusion:

The paper presents one person's view of the situation in one group of assessments. The author will welcome discussion with fellow teachers and examiners of how they approach mapping skills in their assessments. Do they encourage drawing of maps? Are topographic maps necessary in examinations at the 18+ stage? Do they know of research into map-use under examination conditions?

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Ref Geog V (2)

PERCEPTIONS OF GEO-SPACE

M.E. Erin Lawlor

The development of abilities in 15-17 year olds through geography may lead either to an academic or to a non-academic career. In this Paper I will recommend three basic tools for the perception of geo-space:

1. a sense of orientation
2. a sense of scale
3. an ability to observe accurately

with examples to initiate thinking and to enhance understanding at each level. The geography **OF** New Zealand has had and continues to have an effect on the practice of geography **IN** New Zealand. Pupils have the opportunity to develop a quality of mind - balanced, analytical and mature in our practical and field programme.

PERCEPTIONS OF GEO-SPACE

DEVELOPING ABILITIES IN 15-17 YEAR OLDS

M.E. Erin Lawlor

Geography has stood the test of time: a certain quality of mind - balanced, analytical and mature. When your teaching initiates thinking, as distinct from rote learning, you establish a framework for understanding and a skill for life (**NON SCHOLAE SED VITAE DISCIMUS**). Education has been defined as a process whereby the mind is freed. (Cobham, 1960,146) This freedom may be enriched with skills in the interpretation of physical phenomena. However,

> "Try not to become a person of success but rather try to become a person of value."
>
> (Albert Einstein, 1879-1955)

is true for our classrooms. We are not so concerned with success, which is only relative, as we are with providing an opportunity for something of real value to be established. The development of abilities in 15-17 year olds toward both academic and non-academic livelihoods, through a three year course in geography is enhanced by the thinking, practical, social and valuing skills required by our syllabus. In this Paper I will recommend three basic tools for the perception of geo-space:

1. a sense of orientation
2. a sense of scale
3. an ability to observe accurately

'What is where?' is the approach in the first; 'How far?' and 'How much?' are addressed in the second; while intelligent observation as a prerequisite of science is the focus of the third.

"Geography's problems remain essentially as they were in ancient times: to account for the locations and spatial arrangements of phenomena on the earth's surface" (Holland and Johnston, 1987, 1)

A group of 15 year olds may, or may not bring a set of skills with them to a geography class; they may be quite unsure of the step they are taking and require concrete experience to reassure them of their whereabouts in this new discipline. The sense of achievement by the end of February from a series of exercises in orientation, scale and observation works marvels for these pupils. They have emerged from diffidence even on the local scene to the global perspective within a framework of grids and sizes which reveals the intricacies of our international language - spatial arrangement by mapping. Your A4 page may represent this classroom, this city, this state/province, this country, the world, provided you think through and understand the idea of proportion. Spatial arrangement of phenomena on the earth's surface is a whole new sphere; sometimes that map just does not seem to fit reality, eg 'Where's north?' or 'Plot the 20m contour line' (the terrace on both sides of the valley in our flood-plain excursion). This is even more complicated for the 15 year old perception when the 3D concept is introduced in time and place, eg the 'wall of water' in the wake of excess precipitation from a stationary front. The abstraction becomes a real experience after mapping the isohyets, graphing the flows over time and standing on the river bank to discover the level must have been 'over our heads'. Success is proportionate to minds remaining open, questing and receptive.

In year two these tools may be refined to encourage an interpretation of the surface of the earth through good cross sections using both maps and 'an eye for landscape' in the field.

Senior pupils are likely to be able to interpret the landscape in a process format, ie What chain of events over geological time has led to what we see today? Normally it is desirable to use maps to set the scene but the building and the modification processes become apparent 'on site', eg in the Queenstown Basin, a specific geographic environment, active participation in the piecing together of what we see today 'right before our eyes' develops the teenage sparkle of understanding - and thus the science of geography. The geography **OF** New Zealand has had and continues to have, an effect on the practice of geography **IN** New Zealand.

> ".....it has even imprinted the perceptions of visitors....."
>
> (Holland and Johnston, 1987, 16)

and established a sense of respect for the power of nature in our island nation. The role of geographers in our classrooms is a very responsible one: from the 'orange-peel world', to establish the fact that appearances can often be deceptive for first year pupils, to prediction from an observed data-base within our problem-solving/decision-making opportunity with third year classes. Opinion is free while facts are sacred!.

The responsibility of the discipline Geography then stretches from the academic to the non-academic in so far as it contributes to a thinking public who in turn have the ability to perceive their geo-space in a structured manner. The content of 'what geographers study' is amenable to theoretical analysis; the skills inherent in the geographer's craft and much of the discipline's present'day content are relevant to policy-making. Most economic and social decisions involve place, substance and movement, ie a significant spatial dimension. A sound case could be made for geography in the core curriculum - meantime, the developing of specific geographic abilities, eg as discussed, initiates progressively higher thinking skills for the 'not quite' people, the 15-17 year olds (who have emerged from childhood but are not yet fully adult). Geography addresses the questions 'What is?' and 'What is where?' very successfully. (see OHPs for assessment criteria on 0-5 scale). During the process of freeing the mind this young person perceives the world through a framework which will lead him/her toward the 21st Century with confidence. All pupils deserve this experience.

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HOD Geography
Southland Girls' High School

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HOLLAND P.G. & JOHNSTON W.B. (1987) Southern Approaches Geography in New Zealand, N Z Geographical Society (Inc), Print Pac, Dunedin
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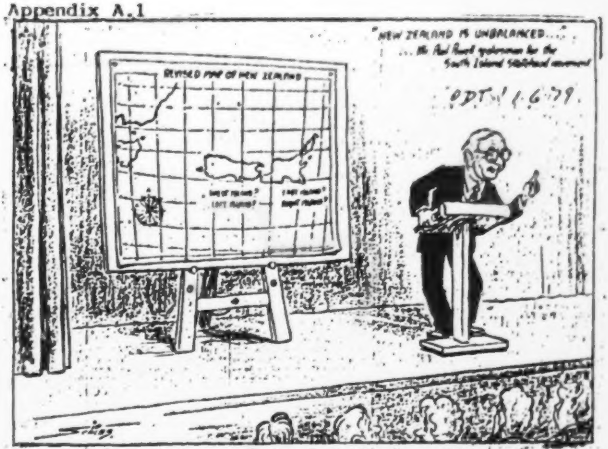
New Zealand Geographer, (various editions)
Otago Daily Times, 1.6.79, Cartoon
National Guidelines Syllabus and Southland Girls' High School Scheme
New Zealand Journal of Geography, (various editions)

Appendix A.1


"NEW ZEALAND IS UNBALANCED..."
South Island
REVISED MAP OF NEW ZEALAND

ODT 1.6.79.

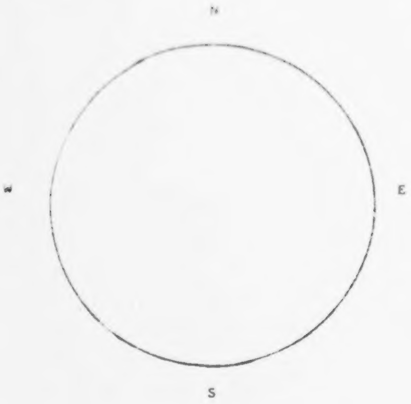
"You see—Captain Cook did it all wrong!"

Appendix A.2

New Zealand

APPENDIX B1

1. Orientation

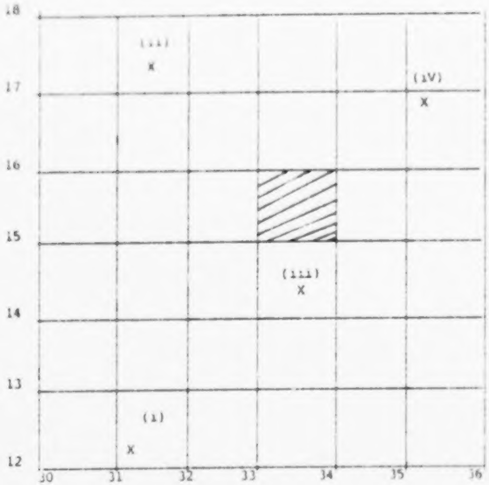


(i) Mark on this Compass: South West and North West then 45°, 340°, 140°, 270°.

(ii) In one concise paragraph explain the importance of the compass for a pilot.

(iii) Where is New Zealand situated in relation to Australia and Antarctica?

2. Grid Reference:


18
17
16
15
14
13
12
30
31
32
33
34
35
36
(ii)
X
(iV)
X
(iii)
X
(i)
X

(i) Give a four-figure grid reference for the shaded area.

(ii) Label the points marked X with a six-figure G.R.

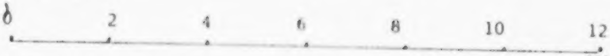
(iii) In a concise paragraph show how this type of Orientation is important throughout the world.

APPENDIX B 2

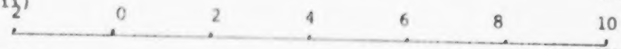
B Scale

1. Distance

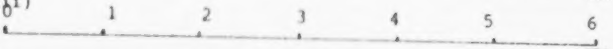
(i)


0
2
4
6
8
10
12
KM

(ii)


2
0
2
4
6
8
10
KM

(iii)



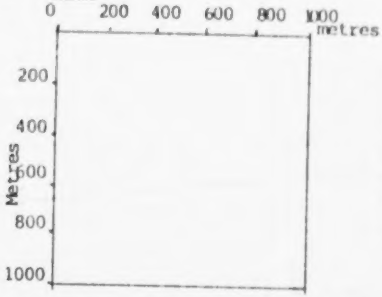
Convert the above linear scales to

a. a statement

b. a representative fraction

(iv) On your map "My Route To SGHS" show in three ways the scale you have calculated.

2. Area


0
200
400
600
800
1000
metres
200
400
600
800
1000
Metres

(i) Use dotted lines to complete the grid.

(ii) If M2/10000 = hectares then this Grid represents how much space?

(iii) Show how this Grid system may be helpful in an understanding of mapping techniques.

(iv) On our Mixed Farming Field Excursion measure an area 100m x 100m. How many Stock Units are likely to depend on this much space for the year?

(v) Why is the study of area important for both the farmer and the geographer?

APPENDIX C1
Form VI Internally Assessed Course S.F.C.

Orientation

1. Direction & Bearing (i) Pin point South America's boundaries using Latitude and Longitude. Calculate its size. Repeat similar procedure for New Zealand and China.

(ii) The 'path of the Amazon' flows 'every which way'. Use geographic terms and specific examples to justify, or to reject, this statement.

2. Grid Reference (i) Use NZMS 260 F45 Gore 1:50000 to locate the Cross Section GR 904540 to 326460

(ii) Attempt an explanation for the relief features in this landscape.

(iii) Which single feature may have been important in the building phase?

(iv) Which single feature has been important in the modifying phase?

(v) Locate carefully at least one other cross section to reveal similar features to the one you have constructed above.

B Scale

1. Distance (i) Using the string technique establish the length and the width of the Mataura Valley

(ii) Construct a Longitudinal profile for this river: mark Upper and Lower theoretical sections.

2. Area (i) Using the Grid Squares method calculate the amount of geographic space within the Mataura Valley catchment.

(ii) Establish the drainage network

(iii) Allocate each stream an order

(iv) At which point in this system would you expect velocity to be greatest.

Recommended NZMS 260 F45 Gore 1:50000
and NZMS 242 Sheet 4 1:500000

Form VII University Bursary APPENDIX C1

Orientation

1. Direction & Bearing (i) Locate Ice Flows in the Queenstown Basin.

(ii) What is the predominant orientation of the intermontane basins of the Southern Alps?

(iii) Present a large scale précis map of the L. Wakatipu glacial features to reveal your understanding of the Ice Pathways.

2. Grid Reference (i) Pinpoint at least three Cross-sections to illustrate Ice Sculpture.

(ii) Present at least two of these to illustrate your understanding of both erosional and depositional processes.

(N.B. specific guides to these requirements are given in the field, see attached worksheet 27.05.88 B33)

B Scale

1. Distance (i) Trace the path of a snowflake from the nevé fields high in the Humboldt Mts to its one time destination at Kingston.

(ii) Show both graphically and diagrammatically the role of environmental variables e.g. temperature in time and place.

2. Area (i) How would you attempt to calculate the volume of ice experienced in the Queenstown Basin during an earlier Geological era?

(iii) This 3D Sculptor left a rich inheritance for people in the late 20th Century - explain.

Appendix D.1
OBSERVATION

THE KEY TO THE PAST:
Queenstown Basin Field Study

AIMS: 1. To understand the present landform features.
2. To use this knowledge to interpret the geological sequences in the environment.

PHASES TO BE OBSERVED:

1. Building, ie after a period of uplift the folding and faulting of the schists have produced the block faulted landscape. Ex.1.
2. Modifying
   (i) erosional (eg Crown Terrace, Ex.2.)
   (ii) depositional (eg Kingston Moraines, Ex. Map B)

TASKS:

1. Orientation - Pathways of Ice - Map A
2. Orientation - Advance and retreat of Ice - Map B
3. Scale - Mountain Formation - Ex 1
   - Crown Terrace - Modifying Ex 2
4. Observation - Explain the sequential development of this landscape emphasising change over a very long period of time.
5. Observation and Accurate Representation
   Exs 1 & 2 worksheet (see Appendix D.2)
6. Mini Essay - Tourism and The Legacy of Glaciation

NB: This Field Excursion contributes to:
Part I - Natural Processes - Glaciation
and to
Part III - Regional Problem - Decision Making part
of the University Bursary/Scholarship Syllabus

Appendix D.2

WORKSHEET

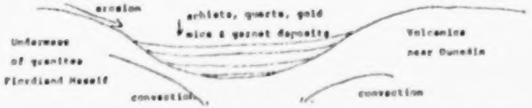
GEOGRAPHY: Natural Processes

1. Kingston (a) (i) freehand cross-section W-E
(ii) explain 'building' and 'modification' as they apply to this transect
(iii) if drainage took place, then where?

(b) use Sheet S142 NZMSI to:
(i) present a 'stream-lined' cross-section from grid reference 593373 to 695355 then explain why there is almost twice the horizontal distance east of the Lake shore up to a similar height?
(ii) construct a fully documented cross-section from grid reference 555299 to 604279 (you should include VE, processes, products, use)

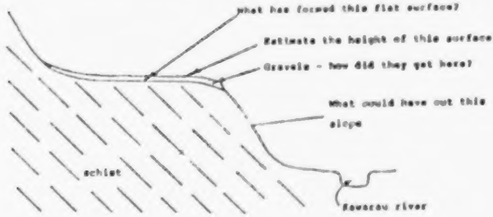
2. From Sheet 132, NZMSI WAKATIPU make three cross sections
(i) GR 534592 to 682658
(ii) GR 512730 to 534592
(iii) GR 567683 to 632696 then
(a) ensure orientation is clearly labelled
(b) account for landforms
(c) approx level of maximum glaciation?

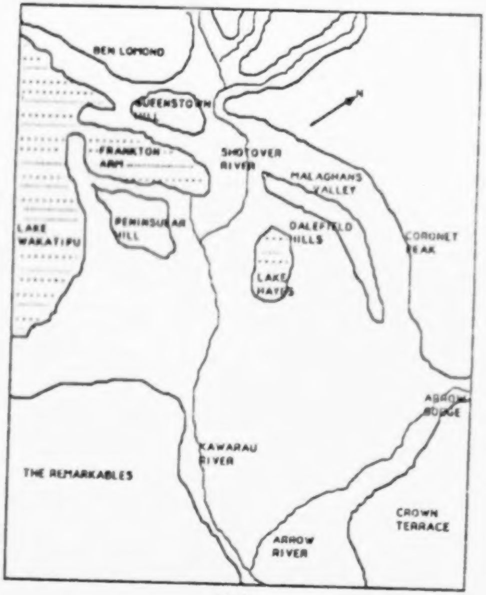
Ex 1 How have these mountains been formed?
- some ideas:


erosion
schists, quartz, gold
mica & garnet deposits
Undermass
of granites
Fiordland Massif
Volcanics
near Dunedin
convection
convection

After a period of uplift, folding and faulting of the schists have produced the block faulted landscape.

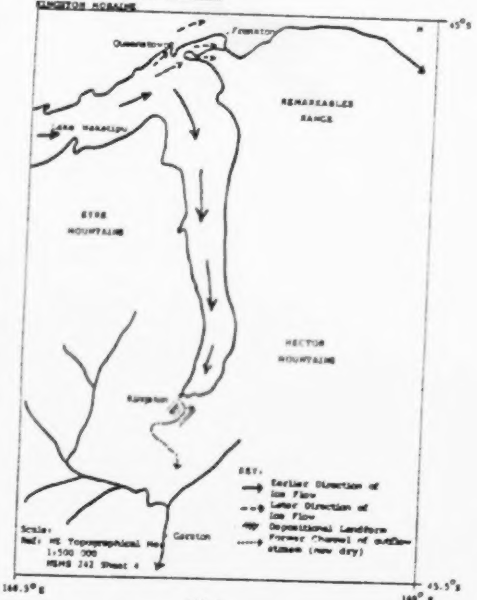
Ex 2 Look at the Crown Terrace - something has formed this odd feature!!


What has formed this flat surface?
Estimate the height of this surface?
Gravels - how did they get here?
What could have cut this slope
schist
Kawarau river


BEN LOMOND
QUEENSTOWN HILL
N
FRANKTON ARM
SHOTOVER RIVER
MALAGHANS VALLEY
PENINSULAR HILL
LAKE WAKATIPU
DALEFIELD HILLS
CORONET PEAK
LAKE HAYES
ARROW GORGE
KAWARAU RIVER
THE REMARKABLES
CROWN TERRACE
ARROW RIVER

MAP A

Study Area: Depositional Landform
KINGSTON MORAINE


Queenstown
Frankton
N
45° S
Lake Wakatipu
REMARKABLES RANGE
EYRE MOUNTAINS
HECTOR MOUNTAINS
Kingston
Garston
KEY:
Earlier Direction of Ice Flow
Later Direction of Ice Flow
Depositional Landform
Former Channel of outflow stream (now dry)
Scale:
Ref: NZ Topographical Map
1:500 000
NZMS 242 Sheet 4
168.5° E
169° E
45.5° S

MAP B

Appendix E

SKILLS

COLLECTION AND/OR PRESENTATION OF INFORMATION

The student

0 Has not met minimum course requirements.

1 Is able to collect and/or present some information.

2 Is able to collect and/or present some relevant information.

3 Is able to collect and/or present some relevant information appropriately.

4 Is able to collect and/or present most relevant information appropriately and accurately.

5 Is able to collect and/or present all relevant information appropriately and accurately.

APPLICATION OF PRACTICAL SKILLS

The student

0 Has not met minimum course requirements.

1 Attempts to interpret information.

2 Is able to use some aspects of method(s) of task design and/or analysis and draw conclusions.

3 Is able to use appropriate method(s) of task design and/or analysis and draw conclusions.

4 Is able to use appropriate method(s) of task design and/or analysis and draw valid conclusions.

5 Is able to use appropriate method(s) of task design and/or analysis, draw valid conclusions and thoroughly evaluate the activity(ies).

PRACTICAL SKILLS

COLLECTION AND/OR PRESENTATION OF INFORMATION

The student is able to collect and/or present information.

Levels	Amount	Relevance	Appropriateness	Accuracy
0	M.R.N.M.			
1	Some			
2		Relevant		
3	↓		Appropriately	
4	Most			Accurately
5	All	↓	↓	↓

APPLICATION

The student

Levels	Method(s) of	Conclusions	Evaluation
	Task Design and/or Analysis		
0	M.R.N.M.		
1	Attempts to interpret information		
2	Is able to use some aspects	Draw conclusions	
3	Is able to use appropriate		
4		Draw valid conclusions	
5	↓	↓	Thoroughly evaluate activity (ies)

STUDENT SKETCH MAPS AS A SURROGATE FOR GEOGRAPHIC KNOWLEDGE

Charles L. MacCabe
University of Arizona
Tucson, United States

Concern for the inadequate quality of geographic education at the primary and secondary levels has risen dramatically in the United States in recent years. Numerous studies have poignantly depicted these inadequacies by publishing results which demonstrate that geographic illiteracy is the norm among university students.

To probe more deeply into questions surrounding geographic education, geographic knowledge, and course performance, two studies were conducted with students in introductory courses in world geography at the University of Arizona in 1986 and 1987. Sketch maps of world drawn by the students were collected at the beginning of the semester from the first group (1986) and final grades were predicted based on the quality of the sketch maps as determined by the investigators, the author and Thomas F. Saarinen. This preliminary study raised numerous questions that resulted in a more extensive study conducted in 1987 with a new group of students. At the beginning of the semester, this second group was asked to draw a sketch map of the world, take the National Council for Geographic Education Competency-Based Geography Test, and complete a questionnaire during the same class period. The sketch maps were again rated, and then compared with the test scores, the final class grades, and the questionnarire responses. The questionnaire asked for personal information or each student including details about their educational background in geography, sources of world knowledge, impressions of the exercise, and other relevant data.

This more extensive second study produced some notable results. Scores on the NCGE test and the sketch map ratings were found to be closely related, demonstrating that world sketch maps are a useful surrogate for world geographic knowledge. The results also revealed that, on the average, boys did substantially better than the girls in both the sketch map exercise and the test of geographic knowledge, suggesting that boys reach universities with more complete geographic knowledge than girls. However, the girls' comparable innate ability to assimilate geographic information was confirmed by their final grades in the class, which were, on the average, actually superior to the boys'. Information about the world appears to come from a variety of sources and the importance of those sources varies. Formal schooling was clearly one of the most important information sources, and the lack of adequate primary and secondary training in geography helped to explain differences in student performance on the exercises.

Sketch Maps of the World as Surrogates for World Geographic Knowledge

Thomas F. Saarinen, Charles L. MacCabe and Barbara Morehouse

Department of Geography, University of Arizona

I. INTRODUCTION

Student sketch maps of the world form the basic data set for our study of images of the world. During 1986 we collected over 4,000 sketch maps from over 50 countries to try to measure variation in images of the world. For a cross-cultural study of this scope sketch maps are easier to use than standard tests which would have to be translated into many different languages.

We assume that sketch maps provide a reasonable surrogate for geographic knowledge although we do not wish to suggest that ability to sketch an excellent map of the world should be the aim of geographic education. Rather we regard the information which allows one to draw a sketch map as a beginning point for geographic thinking (Muercke 1981) much as the multiplication table is a basic tool for thinking in numbers.

The earliest use of the term "cognitive map" is credited to Tolman (1948), but much of the inspiration for subsequent research can be attributed to The Image of the City by Lynch (1960). The first volume to address the scope and approaches to studying cognitive maps was Image and Environment written by Downs & Stea (1973); this was followed by more popular introductions to the field by Downs & Stea (1977) and Gould & White (1974, 1986). From these beginnings, the literature has grown to include hundreds of articles, the flavor of which may be sampled by a perusal of articles issuing from a variety of disciplines (Boyle & Robinson 1979; Cox & Golledge 1969, 1981; Downs 1981; Evans 1980; Golledge & Rushton 1976; Golledge et al. 1985; Lloyd 1982; Moore & Golledge 1976; Olson 1984; Spencer & Blades 1986; Tobler 1976; Tuan 1975; Wood 1971). A thoughtful recent two part review of literature of cognitive maps of cities, the most frequently studied scale, is provided by Gollege, Gale, and Richardson (1985, 1987).

Cognitive mapping is defined by Downs and Stea (1973, p. xiv) as,

> "a construct which encompasses those cognitive processes which enables people to acquire, code, store, recall, and manipulate information about their spatial environment. This information refers to the attributes and relative locations of people and objects in the environment, and is an essential component in the adaptive process of spatial decision making."

Having people draw a sketch map on a blank sheet of paper is one technique, among many, for investigating cognitive or mental maps. Among the functions of mental maps suggested by Yi-Fu Tuan (1975) are, as a mnemonic device, and as a means to structure and store knowledge. If he is correct, we might expect that the quality of the mental map could be related to its utility as a mnemonic device and as a means to structure and store knowledge. In other words people with inaccurate or incomplete mental maps would have greater difficulty organizing and storing geographical information and hence might be expected to perform poorly in geography courses while those with detailed and accurate mental maps might be expected to perform well. The casual mention of some characteristic of Burkina Faso, for example, might be retained and associated with other items if that place is part of one's global mental map; otherwise the information might be lost for lack of a "hook" to hang it on.

We decided to test this assumption in an introductory world regional geography classroom at the University of Arizona. Our basic test is the comparison of the quality of sketch maps of the world drawn on the first day of class with the final grade for the course. Our hypothesis is that there would be a direct relationship between the quality of the individual sketch maps and the final grade in the course. Individuals who draw excellent sketch maps would be more likely to obtain the excellent grades than those who draw very good sketch maps and so on. Those who were least able to sketch a map of the world would thus be those most likely to receive the poorest grades.

II. THE FIRST PHASE

At the beginning of the semester in the fall of 1986 we asked students in the world regional geography course to sketch a map of the world on a blank sheet of paper. The exact instructions were:

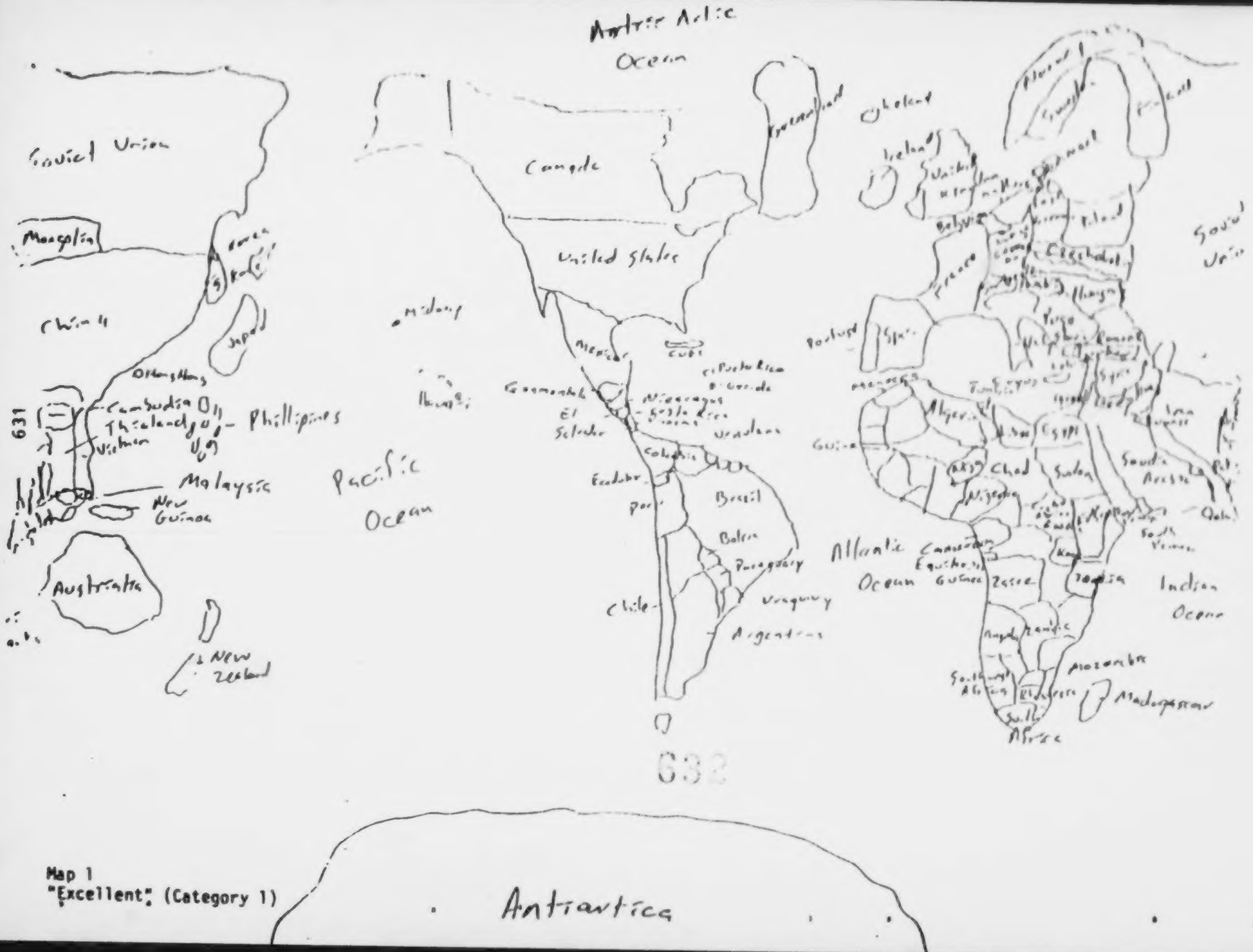
> "Draw a sketch map of the world on this sheet of paper (8-1/2 x 11 inches). Label all the countries and any other features you think are of interest or importance. Do not worry if your map is not perfect. Just do the best that you can. I am sure you will find this an interesting exercise once you get started. Take about 20 to 30 minutes to complete the task."

By this means we obtained a sample of 67 maps.*

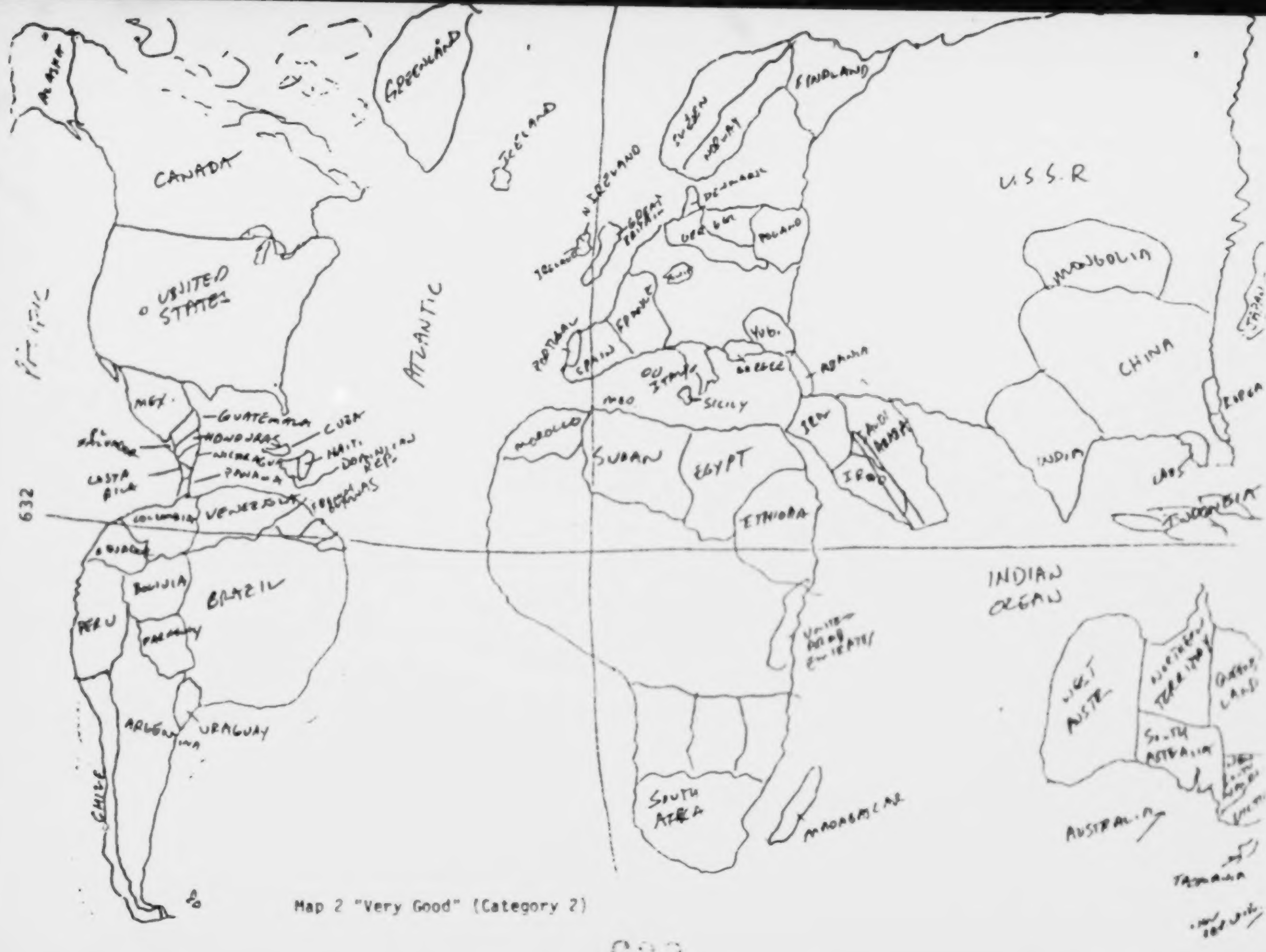
These were classified into 5 categories on the basis of the quality of the maps (see Maps 1-5 for examples from Map 1, excellent to Map 5, poor). The quality was judged by the number of countries included and the quality of the size, shape and location relationships depicted on maps. The criteria for judging them are listed in Table 1. In general, though not always, the maps with the best depiction of size and shape relationships also contained references to more countries. Thus there is a certain overlap in number of countries included in the criteria. The number of correctly placed countries per map was only tabulated after our final decision but this criterion worked well and therefore was incorporated into our rating scheme.

After some discussion regarding criteria for judgment each author placed each map into one of the five categories. Then the two classifications were compared. The agreement was strong. Over two-thirds of the maps (50) were placed in the same category by each of the two judges. No maps were more than

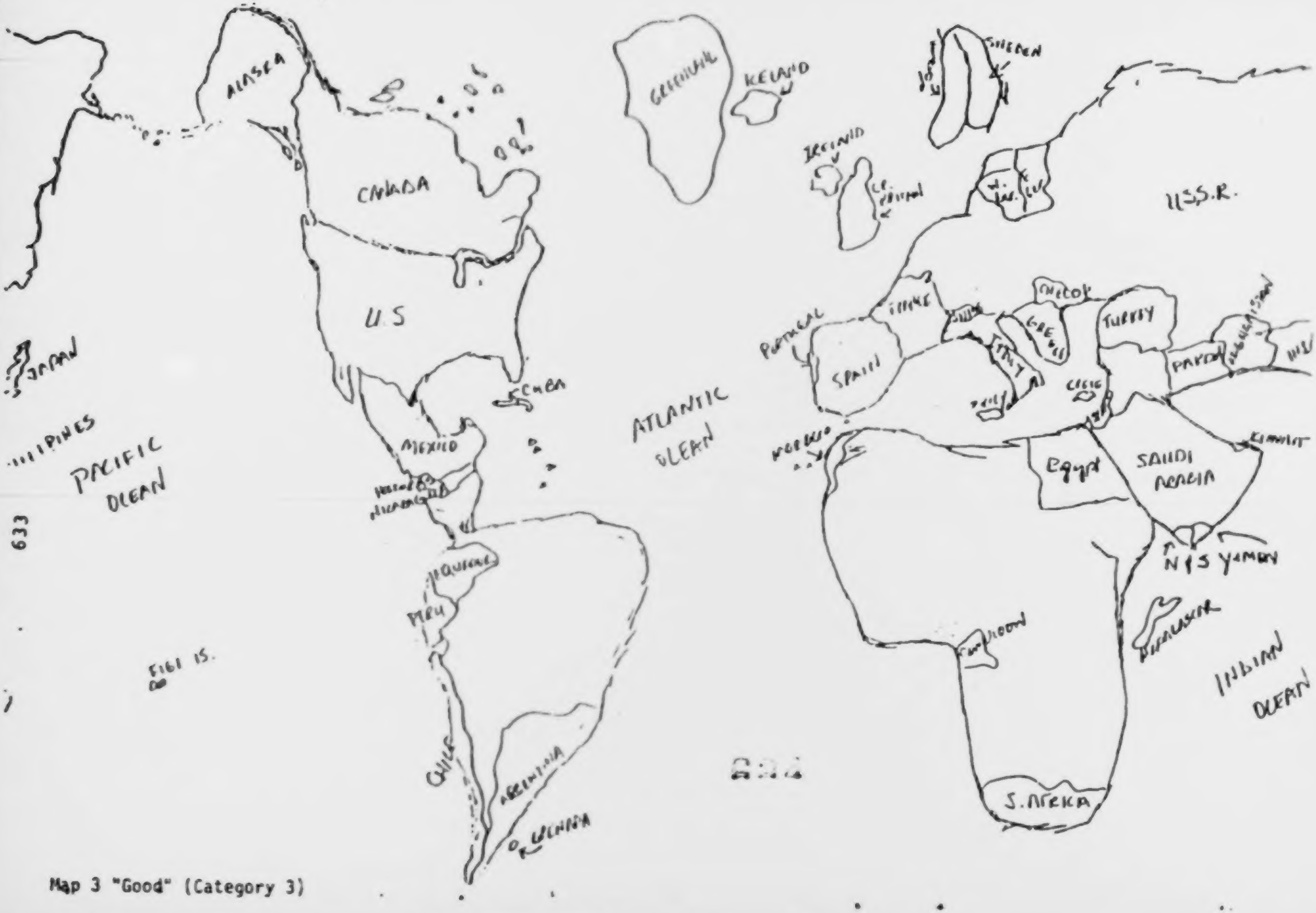
*The original sample was larger but there was some attrition over the course of the semester so that in the end we had 67 students who had both sketched the preliminary map and completed the course.


Antrtic Artic
Ocean
Soviet Union
Mongolia
China
Korea
Japan
Hong Kong
Cambodia
Thailand
Vietnam
Phillipines
Malaysia
New Guinea
Australia
New Zealand
Midway
Hawaii
Pacific
Ocean
Canada
Greenland
Iceland
United States
Mexico
Cuba
Puerto Rico
Guatemala
El Salvador
Nicaragua
Costa Rica
Panama
Venezuela
Colombia
Ecuador
Peru
Brazil
Bolivia
Paraguay
Uruguay
Chile
Argentina
Atlantic
Ocean
Ireland
United Kingdom
Belgium
Norway
Sweden
Finland
Denmark
Poland
France
Germany
Czechoslovakia
Austria
Hungary
Portugal
Spain
Yugo
Romania
Bulgaria
Italy
Greece
Turkey
Syria
Iraq
Iran
Israel
Morocco
Tunisia
Algeria
Libya
Egypt
Guinea
Chad
Sudan
Nigeria
Saudia Arabia
Cameroon
Equitorial Guinea
Kenya
Zaire
Tanzania
South Yemen
Oman
Angola
Zambia
Mozambique
Southwest Africa
Rhodesia
South Africa
Madagascar
Indian
Ocean
Soviet Union
Antartica

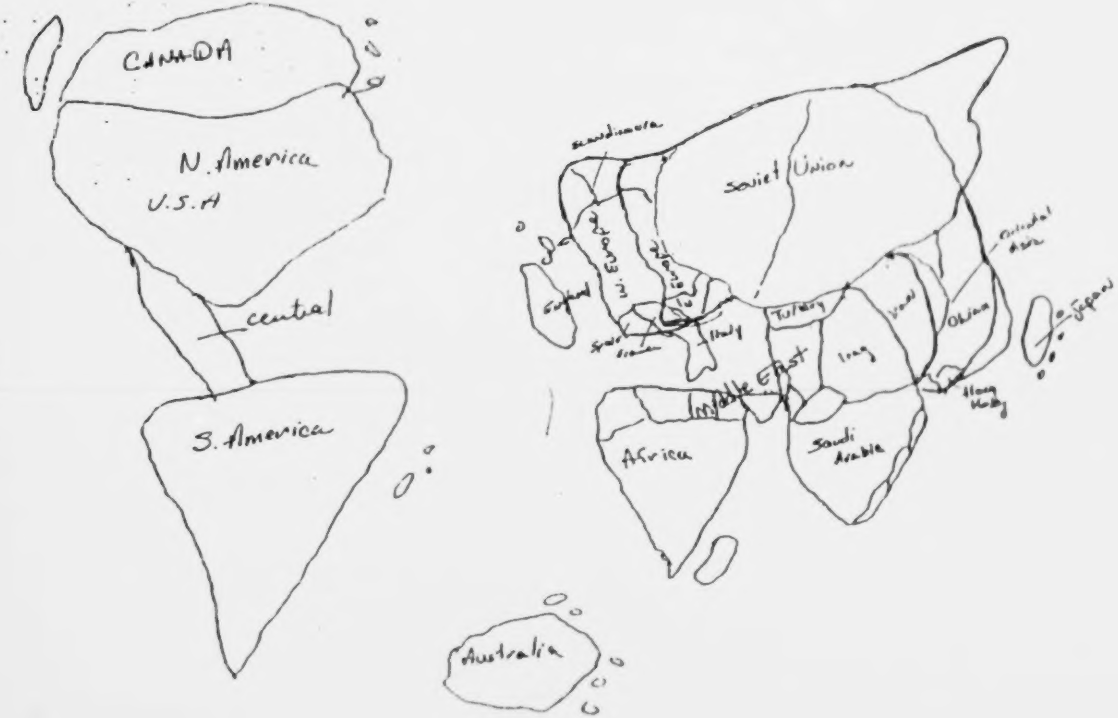
Map 1
"Excellent" (Category 1)


ALASKA
GREENLAND
ICELAND
CANADA
UNITED STATES
PACIFIC
ATLANTIC
MEX.
GUATEMALA
HONDURAS
EL SALVADOR
NICARAGUA
COSTA RICA
PANAMA
CUBA
HAITI
DOMINICAN REP.
FRENCH GUIANA
VENEZUELA
COLOMBIA
ECUADOR
BOLIVIA
BRAZIL
PERU
PARAGUAY
ARGENTINA
URAGUAY
CHILE
N. IRELAND
IRELAND
GREAT BRITAIN
PORTUGAL
SPAIN
FRANCE
ITALY
MED
SICILY
GREECE
YUG.
ALBANIA
DENMARK
GER.
POLAND
SWEDEN
NORWAY
FINLAND
U.S.S.R
MOROCCO
SUDAN
EGYPT
ETHIOPIA
IRAQ
SAUDI ARABIA
UNITED ARAB EMIRATES
SOUTH AFRICA
MADAGASCAR
INDIAN OCEAN
MONGOLIA
CHINA
JAPAN
KOREA
INDIA
LAOS
INDONESIA
WEST AUSTR.
NORTHERN TERRITORY
QUEENSLAND
SOUTH AUSTRALIA
AUSTRALIA
TASMANIA
NEW ZEALAND

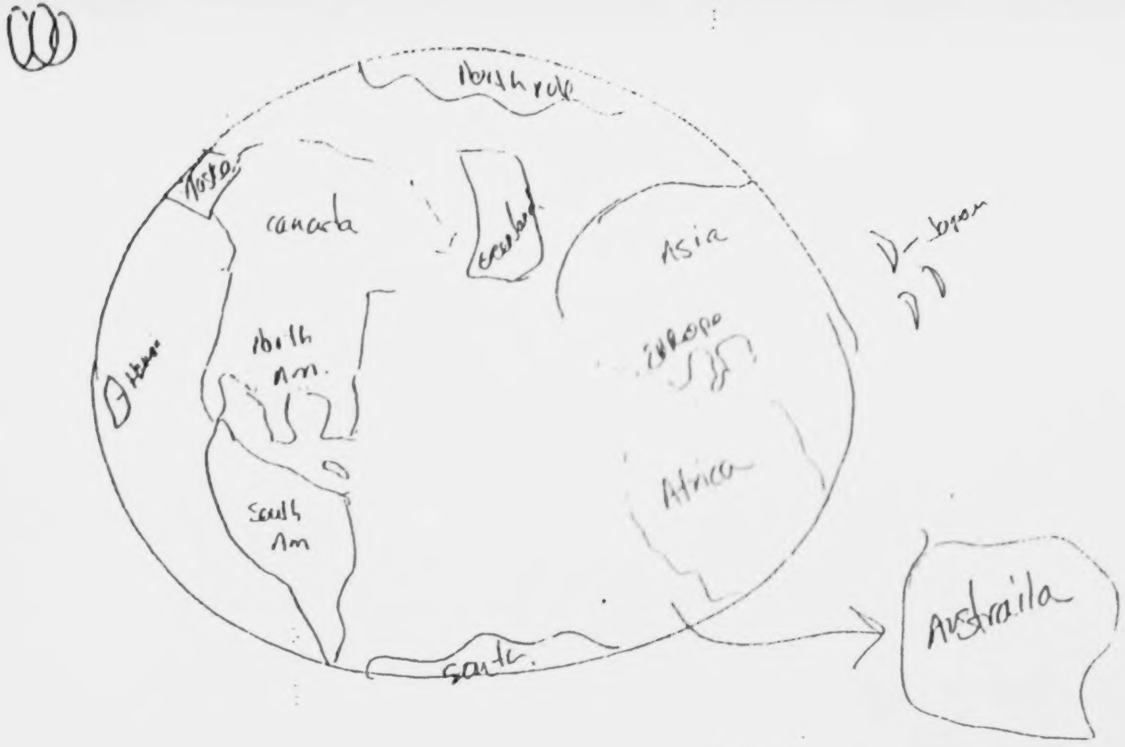
Map 2 "Very Good" (Category 2)


ALASKA
CANADA
U.S
CUBA
MEXICO
GREENLAND
ICELAND
SWEDEN
IRELAND
GT. BRITAIN
U.S.S.R.
PORTUGAL
SPAIN
FRANCE
ITALY
GREECE
CZECH
TURKEY
IRAN
AFGHANISTAN
EGYPT
SAUDI ARABIA
KUWAIT
N & S YEMEN
MADAGASCAR
INDIAN OCEAN
ATLANTIC OCEAN
PACIFIC OCEAN
JAPAN
...ILIPINES
FIJI IS.
ECUADOR
PERU
CHILE
ARGENTINA
S. AFRICA
MOROCCO
CAMEROON
CRETE
SICILY

Map 3 "Good" (Category 3)


CANADA
N. America
U.S.A
central
S. America
scandinavia
W. Europe
E. Europe
England
Spain
France
Italy
Soviet Union
Turkey
Iraq
India
China
Oriental Asia
Japan
Hong Kong
Middle East
Saudi Arabia
Africa
Australia

Map 4 "Flawed" (Category 4)


North pole
Alaska
canada
Greenland
Hawaii
North Am.
South Am
Asia
Europe
Africa
south.
Japan
Austraila

Map 5 "Poor" (Category 5)

Table 1

Verbal and Numerical Criteria For Classifying World Sketch Maps

Category	Verbal Description	Number of Countries Correctly Placed
1. Excellent	Includes all major world regions with good coverage of countries, even in areas with many small countries such as Central America, S.E. Asia, and Eastern Europe.	75 or more
2. Very Good	Generally, all world regions included, though occasional gaps in the names, or errors in placement; generally good size and locational relationships.	45 - 74
3. Good	Broad world coverage; some flaws in terms of some continents; less information included.	30 - 50
4. Flawed	Contains limited number of, and some incorrectly placed countries; continents may be poorly shaped or arranged; some continents without countries labeled; some continents or regions misplaced.	20 - 30
5. Poor	Limited to continents which may only be vague blobs; few countries correctly placed.	Below 20

one category apart. Of the 23 maps which were not placed in the same category 12 were placed one category higher and 11 one category lower. These 23 were then discussed and agreement reached on which category each should be placed in. The authors did not know the students and were not teaching the course.

The ratings on the individual sketch maps drawn at the beginning of the semester were compared with the final grades for the course. Correlation was .26 which is significant at the .95 level of confidence. This suggests that there is a strong relationship between the quality of the original sketch map and the grade achieved in the course but the results raised other questions.

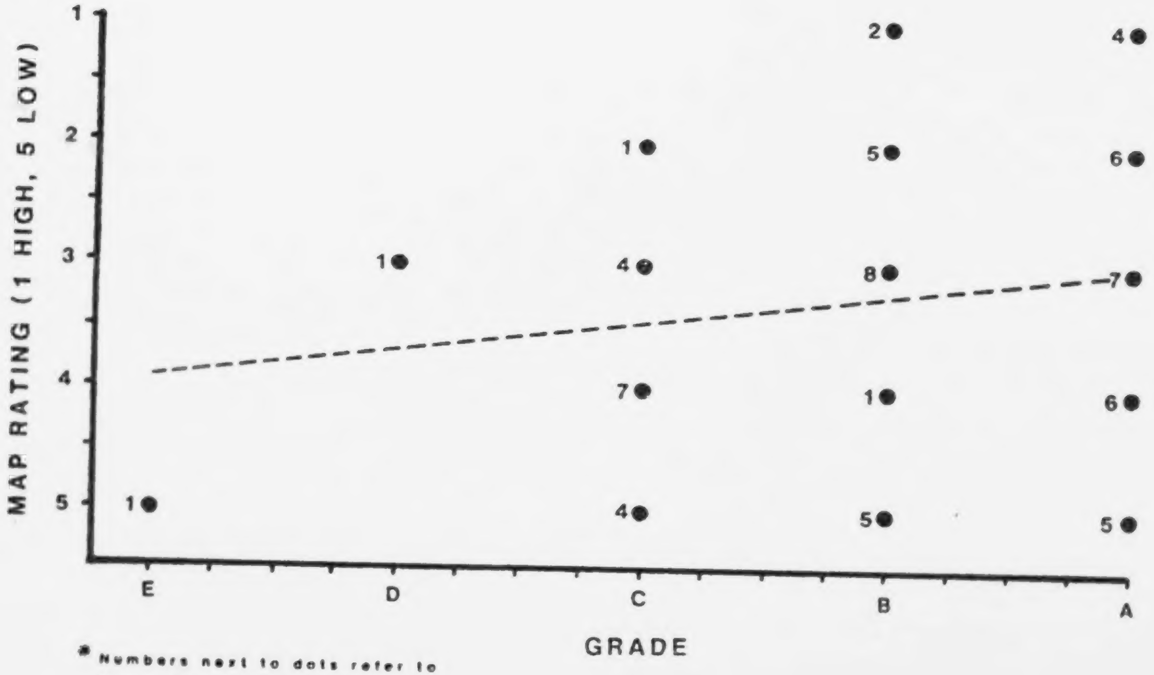
Figure 1 indicates the distribution of sketch quality plotted against class grade. The relationship is strong but the distribution indicates that even some people who drew poor maps managed to earn A's in the course. The interesting thing to note is that the map quality seems to set a lower limit on grades. For example the lowest grade achieved by anyone who drew a top quality map was a B. The lowest grade achieved by anyone in our second category of map quality was a C and so on. Only one person in the entire class failed and this person's original sketch map was rated as poor.

We considered the exercise a success in terms of demonstrating that the ability to draw a sketch map of the world on the first day of class was related to class performance as measured by the final grade. But because so many people who could only draw fair or poor maps managed to earn A's we decided to extend the study to probe more deeply. We wanted to explore more fully the relationship between map sketching ability, geographic knowledge and course performance; as well as seek explanations for the individual differences observed. A number of researchers in cognitive mapping have suggested that inputs from the environment that form the basis of mental maps are derived from

Figure 1

RELATIONSHIP OF MAP QUALITY TO GEOGRAPHY GRADE

y + 357x = 1.236 N = 67*



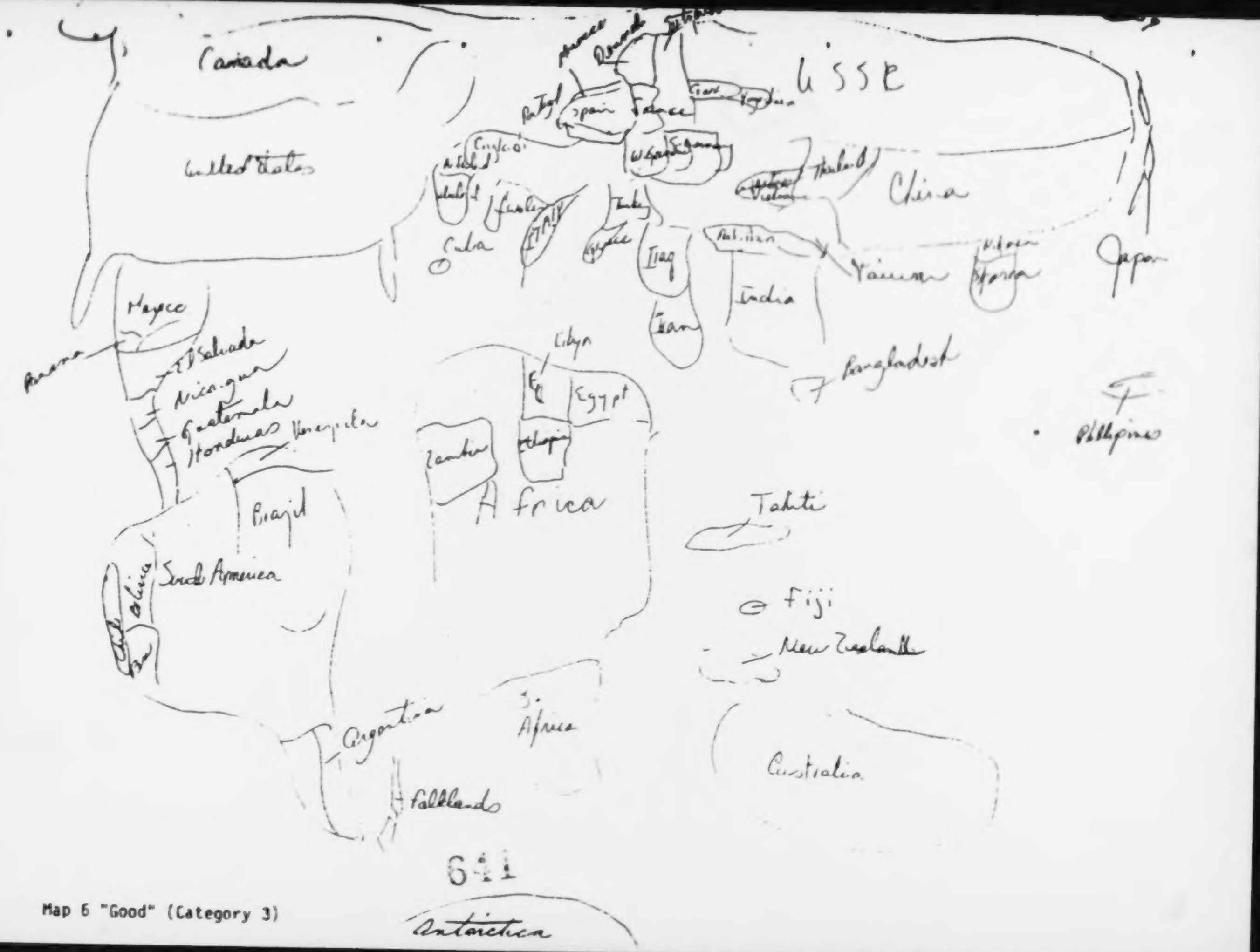
* Numbers next to dots refer to the number in each category

a variety of sources and the process is complex (Bosowski 1981; Gould and White 1974).

III. THE SECOND PHASE

At the beginning of the semester in the fall of 1987 we asked students in a world regional geography class to sketch a map of the world on a blank sheet of paper. In addition we asked them to answer a short questionnaire (see Appendix A) and take the National Council for Geographic Education Competency-Based Geography test of geographic knowledge. At the end of the semester we once more obtained the final grade. This enabled us to describe more fully the relationship between map sketch quality, geographic knowledge and course grade.

As in the previous year, we classified the maps according to the criteria in Table 1. Each author did it separately. Then the results were compared and disagreements on ratings resolved. The two original authors were joined by the third author for the second phase. With three separate raters there was greater potential for disagreements in the ratings. Of the 72 maps, all three agreed on 21, and two out of three on 46 (with all differences within one category). Three maps were given separate ratings by all authors and two were rated the same by two and more than a category away by the other. The differences were resolved after close examination of the disputed maps. Most of the differences were marginal and based on systematic differences in the individual ratings with one rater tending to rate on the high side while another consistently rating maps lower. The maps which engendered the greatest differences in ratings were generally ones in which the crudeness of the sketch belied the number of countries correctly placed. This underlined the desirability of quantitative as well as qualitative criteria for classification. As an example, we have included Map 6, which has enough countries placed in correct relationship to


Canada
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Falklands
Cuba
N. Ireland
Ireland
England
Finland
Portugal
Spain
France
Morocco
Denmark
W. Germany
E. Germany
Italy
Turkey
Greece
Iraq
Iran
Libya
Egypt
Ethiopia
Zambia
Africa
S. Africa
USSR
Afghanistan
Vietnam
Thailand
China
Pakistan
India
Bangladesh
Taiwan
N. Korea
S. Korea
Japan
Phillipines
Tahiti
Fiji
New Zealand
Australia
Antarctica

Map 6 "Good" (Category 3)

each other to warrant a rating of 3 but is cruder than usual for maps in this category.

Student Assessments of Their Geographic Education

The maps drawn by the students in the 1987 Tucson sample, mainly Americans with an average age of 22, reflect the quality of their geographic education. The geographical education is limited and the sketch maps in general are not good. One third were classified as "poor," another fifth as "flawed," so that less than half could be classifed as good, very good, or excellent (Table 2).

Table 2

Map Quality Ratings for Tucson Sample (1987)

Quality Category	Number	%
1 (excellent)	6	8
2 (very good)	13	18
3 (good)	15	21
4 (flawed)	14	19
5 (poor)	24	33
Total	72	99

According to their questionnaire responses most students in the sample took geography as a part of social studies and most rated their geographic training as fair or poor. One can see in Table 3 that their geography training was rated as fair or poor by 58% at the elementary school level and 55% at the secondary level. The lack of good training in geography was reflected in students' comments on the questionnaire. For example, one student wrote that the exercise "made me feel better about taking this course -- My geography is like most average American students. It is practically nonexistent!!" Some of the students expected the class to give them a basic overview of world geography that is commonly assumed to be provided in primary and secondary school. "I'm taking this class *because* I am poorly informed." "The main reason I took World Regional Geography is to learn all of the countries of the world." Less than 5% regarded their geography training as excellent and less than a fifth as excellent or very good. Table 3 represents the entire sample from the 1987 Tucson world regional geography class. Disproportionately represented in the excellent, very good, and good ratings of geography training were the foreign students in the class. With them removed the rating of geographic training by the class is even more dismal.

Table 3

Student Ratings of Their Geographic Training

Elementary Education Rating	Number	Percent	Secondary Education Rating	Number	Percent
Excellent	2	3	Excellent	3	4
Very Good	11	15	Very Good	10	14
Good	18	25	Good	18	26
Fair	26	36	Fair	21	30
Bad	16	22	Bad	17	25
Total	73	100	Total	69	100

Not only did the American students perceive their geographic education as generally low in quality, there was also not much of it. In Table 4 the number of years of geography in primary and secondary school is compared with the map ratings. First of all it is clear that over 60% of the students reported 2 or fewer years of geography in elementary school and over half had one or no years of geography in secondary school. While most had limited training, there is no standard amount provided so that there was much individual variation in years of geographic education. The average rating of the quality of the sketch maps tended to be higher for those who reported more years of geographic education.

Table 4

Map Rating and Years of Geography
in Primary and Secondary School

	Primary		Secondary	
No. of Years	Mean Map Rating	N	Mean Map Rating	N
4-6	3.00	15	2.83	6
3	3.81	11	3.29	7
2	3.52	23	3.72	18
1	3.80	15	3.72	25
0	4.20	5	3.47	16
Overall	3.57	69	3.55	71

Student Ratings of Sources of Their Knowledge of the World

To further explore the potential sources of knowledge of the world the students were asked to rate the sources as very important, moderately important, of minor importance or unimportant. Their perceptions of the importance of these sources are seen in Table 5. For the convenience of the reader these are listed in order of perceived importance. Generally seen as very important to moderately important are atlases, travel, newspapers, school, TV, books and talking to others. Magazines are seen as moderately important, and movies, games and hobbies are rated as closer to minor in importance. None of the sources were rated as unimportant by the group average.

Table 5

Student Perceptions** of Sources of World Knowledge (n=72)

Map Quality Categories*	Sources of Knowledge										
	Atlases	Travel	Newspapers	School	TV	Books	Talking With Others	Magazines	Movies	Games	Hobbies
1-2	1.31	1.78	1.84	1.66	1.94	1.47	1.89	2.10	2.63	2.89	2.57
3-4	1.44	1.72	1.89	1.67	1.74	1.82	1.89	1.88	2.64	2.72	2.93
5	1.74	1.70	1.65	2.04	1.74	2.17	1.83	2.22	2.26	2.74	2.83
All Maps	1.51	1.73	1.80	1.80	1.80	1.85	1.87	2.06	2.51	2.78	2.80

*Numbers refer to the ratings of map quality from 1 excellent to 5 poor

**The smaller the number the higher the perceived importance, i.e., 1 very important, 2 moderately important, 3 of minor importance, 4 unimportant

There was a significant relationship between sketch map quality and perceived importance of atlases and books. Those who drew the best maps tended to rate atlases and books as more important than those who drew poorer maps. The same relationship, though weaker, appears for school. Those whose maps placed them in the top 2 categories tended to rate school as more important than those who drew the poorest maps. Almost the reverse is true for travel, television and talking with others. Those who drew the poorest maps tended to see travel, television and talking as important sources of their knowledge of the world. They also tended to rate movies higher in importance than those who drew better maps.

To further probe the perceived relative importance, the students were asked to indicate which of the sources they thought was most important in influencing their geographic knowledge. This forces a choice in terms of importance, where several items may be ranked as very important. Table 6 summarizes the results. Clearly the sources of world knowledge perceived as most important varies with

Table 6

Most Important Sources of World Knowledge By Sketch Map Categories

Sources of World Knowledge	Categories of Sketch Map Quality					
	1	2	3	4	5	Total*
Travel	1	4	4	4	10	23
School	1	5	7	2	6	21
Television	0	1	3	3	6	13
Books	4	1	2	2	1	10
Newspapers	0	0	1	3	4	8
Atlases	2	2	2	1	1	8
Magazines	1	0	3	1	1	6
Movies	1	0	0	1	2	4
Talking to Others	0	0	1	0	3	4
Games	0	0	0	0	1	1
Hobbies	1	0	0	0	0	1

*The total does not equal the number in the sample because many listed more than one.

individuals. Among our sample of 72, at least one individual chose each of the eleven sources listed. More interesting is the shift in relative importance of sources when a choice is forced. Most dramatic is the drop in relative importance of atlases and the rise of travel, school, and television. Atlases which had the highest average ratings in importance dropped to a tie for fifth place in terms of the number of individuals who selected it as the most important source. On the other hand, travel and school showed up in a class by themselves.

The perceived importance of school is interesting in light of the very low general rating of geographic education by the sample. In spite of limitations in the quality and amount of geography training, school was still seen as the most important source for world knowledge by close to a third of the sample.

Similar numbers selected travel as their most important source of world knowledge. These people were most frequently found among sketchers of the poorest quality maps. This does not lessen the importance of foreign travel, which appears to have a positive though not statistically significant impact on the quality of world sketch maps (Table 7).

Table 7

Quality of Map Sketch and Amount of Travel

	Number of Foreign Countries Visited					
	None		1-2		3 or More	
	n	Mean Map Rating	n	Mean Map Rating	n	Mean Map Rating
Male	10	3.40	26	3.19	10	2.80
Female	7	4.43	13	4.23	6	3.67
Total	17	3.82	39	3.54	16	3.13

Television and books provide an interesting contrast. Television was selected as the most important source of knowledge by those who draw the worst maps, while for books it was the reverse. Similarly for the next most frequently selected pair, atlases tended to be seen as the most important source by those drawing higher quality maps while newspapers were singled out more often by those who drew lower quality sketch maps. Why this is so will become more apparent below.

We were very curious about what distinguishes the people who draw excellent and very good sketch maps from those who sketch maps of lower quality. To explore this question we asked a series of questions about the behavior of the students in hopes of discovering some potential sources of differences as summarized in Table 8.

A major conclusion which could be drawn from Table 8 is that the people who draw the best sketch maps tend to draw on many sources of information. With only one exception the percent of people in the high group exceeds the percent for the entire sample. This exception highlights their character nicely for it is only in percent ownership of atlases that the group is lower than the entire sample. Since atlases are highly recommended, though not required for the class, most people get one if they don't already own one (over three-quarters of the class). More significant is whether they use it and in this self-report measure the best map sketchers excel. They report the highest percentage occasionally and regularly looking up unknown places. The obverse is that those who drew the poorest maps tended to use fewer sources of information and these less frequently.

Looking back to Table 6 in this light is very interesting. Those who sketch the poorer maps are more likely to rank television, newspapers, and talking to others as their most important sources of knowledge. Although the best sketchers do not tend to single these out as their most important source of

Table 8

Exposure to Sources of Information and Quality of Map Sketches

Sketch Map Rating Group	n	Sources of Information (number indicates % answering yes)									
		Regularly Read Newspapers	Regularly Watch TV News	Own Atlas	Own Globe	Have Maps On Wall	Sometimes Look Up Unknown Places	Often Look Up Unknown Places	Play Geographic Games	Have Collected Stamps	Have Collected Coins
High (1-2)	19	66	89	73	42	42	94	25	63	42	55
Medium(3-4)	29	61	64	96	39	21	85	7	69	46	46
Low (5)	24	46	63	58	25	17	57	0	32	25	30
Overall	72	58	70	77	35	25	78	10	55	38	43

knowledge, they are more likely to use them than the other sources. They rate as most important such sources as books and atlases.

Before leaving this question of who sketches the best maps and why, let's consider briefly a few other variables. We assumed that people who studied foreign languages would be more likely to be interested in other countries and therefore might be able to draw better sketch maps of the world. Table 9 indicates that for the males and the total sample there appears to be a weak relationship with those knowing more languages tending to obtain better map quality ratings. For the females there is absolutely no difference. This raises the question of gender differences to be considered in more detail below.

Table 9

Languages and Sketch Map Quality

Language Knowledge	Sample Groups and Their Average Map Rating					
	Male		Female		Total Sample	
	n	Rating	n	Rating	n	Rating
Just English	21	3.43	13	4.15	34	3.71
2 or More Languages	25	2.92	13	4.15	38	3.34

Sketch Maps as Surrogates For Geographic Knowledge

The main question raised at the outset was whether our sketch maps of the world could be used as a surrogate of geographic knowledge. Having now considered some of the factors which separate the better from the poorer map sketchers, it is time to return to the main question. Two types of data will be considered, a few self-report ratings compared to our map quality ratings and then a comparison of map quality ratings with test scores and class grades.

We asked the students, "Do you think your map accurately portrayed what you know about world geography?" The sample was split precisely down the middle with half saying "yes" and the other half saying "no." This is not a strong endorsemen of the method as a surrogate for geographic knowledge. The mean map ratings were 3.44 for those saying "yes," 3.65 for those saying "no," compared to 3.54 for the total sample. One could conclude that those who felt their geographic knowledge was not well portrayed in the sketch maps were not heavily concentrated in any of the categories of map sketching quality. Those who answered "no" to this question were asked "why not?" The most frequent type of response, by about one sixth of the total sample, referred in some way to drawing ability, as in the comments; "It was pretty close but I'm a terrible drawer" or "I dislike drawing" or "I know where everything is when I see the picture but it's hard to draw when I'm not prepared at all." A few others complained, like the last one, about the lack of preparation, while a couple pointed out that world location was only a part of geography as in the comment "Just because I don't know where the countries are located exactly, does not mean I don't know anything about the country itself."

We looked more carefully at sketch map ratings, scores on the test of geographic knowledge, and class grades of those who said that their sketch maps did not accurately portray what they know about the world. In most cases the sketch map ratings portray the student's level of geographic knowledge by the other measures. Our map quality ratings were mainly based on the numbers of countries included in correct relationship to each other. Variations in artistic quality were not assessed directly.

"Did your ability to draw have an important impact on the countries you put on your map?" was a second question posed. The results are indicated in Table 10. The results are interesting in light of the oft-repeated criticism that sketch maps test drawing ability rather than geographic knowledge. Sixty-two percent said "yes," thirty-nine percent said "no." This would seem to support the criticism but the exact impact is uncertain. The mean map ratings reveal

Table 10

Ability to Draw Had an Impact

	Yes	No	Overall
N	41	26	67
Mean Map Rating	3.10	4.23	3.54

that those who draw the poorest maps generally said "no," indicating that they do not attribute their poor maps to a lack of drawing ability. On the other hand those who said "yes" drew significantly better maps. Drawing ability may have had a positive or negative or perhaps mixed impact. One possible explanation is that the students who drew better maps recognized that the limitations of their drawing ability may have prevented them from drawing more accurate maps, while this was of negligible importance to those who drew poorer maps.

The students in the sample were asked "How would you rate yourself in terms of geographic knowledge?" They were provided with the categories: very knowledgeable, knowledgeable, not well informed and poorly informed. This self-rating corresponded very closely with the sketch map rating (Table 11). Those whose sketch maps were rated excellent tended to rate themselves highly in geographic knowledge and those with poorly rated sketch maps tended to describe themselves as not well informed.

Table 11

Self-Rating -- Geographic Knowledge*

Sketch Map Rating Group		Mean Rating	N
1 High	1	1.3	6
5 Low	2	2.1	13
	3	2.3	15
	4	2.6	14
	5	3.1	24
	Overall	2.0	72

* 1 -- Very Knowledgeable
2 -- Knowledgeable
3 -- Now Well Informed
4 -- Poorly Informed

Table 12 reveals the results of the correlations among sketch map ratings ("Rating") in terms of the five categories indicated above, class grades ("Grade") which are also classified into five categories from A (excellent) to E (fail), and scores on the National Council for Geographic Education Competency-Based Geography Test ("Test"). Because all three tasks (map sketching, questionnaire and test) were given during one class period most people did not complete the test, therefore there were variations in the number of questions completed. To standardize we used the percent correct of the questions answered.

Table 12

Pearson Product Moment Correlation Coefficients of Map Ratings, Class Grades and Geographic Knowledge Test Scores

	Rating	Grade	Test
Rating	--	.18	.61*
Grade	.18	--	.36*
Test	.61*	.36*	--

*significant at the .99 level

All correlations were significant at the .99 level except that between map sketch rating and final grade. This was in the correct direction but not statistically significant.

The strongest correlation was between the sketch map ratings and scores on the test of geographic knowledge. This provides strong support for our assumption that a sketch map of the world could be used as a rough surrogate for geographic knowledge. For this Tucson sample, at least, the individuals who sketched the best maps also performed best on the standard test of geographic knowledge. The correlation of .61 was significant at the .99 level.

Geographic knowledge, as measured on the standard test at the beginning of the semester and the final grade obtained at the end of the semester, was also highly correlated (.36, significant at the .99 level). This very strong relationship shows that those who are more knowledgeable about geography on entry to the world regional geography course are more likely to do well than those with less geographic knowledge. Since the semester lasts over four months, there is considerable time available to remedy one's deficiencies. In spite of this, the entering test score on geographic knowledge is apparently a good predictor of class performance.

The poorest correlation is between the quality rating of the sketch map and the final grade. The correlation of .18, while not statistically significant, is close to that of the previous year, which was .26 and significant at the .95 level. While there appears to be a relationship, the sketch map quality is not as good a predictor of class grade as the test of geographical knowledge. Like the test score, the sketch map quality rating was based on performance at the beginning of the semester and thus the student had room to remedy deficiencies before the final grade was allocated.

Even though sketch map quality and geographic knowledge were highly correlated, the sketch map quality rating did not correlate as highly with the course grade. The main reason for this is that geography test items vary in the degree to which they are based on map knowledge. In the world regional geography course we studied, the exams consisted of multiple-choice items as well as a smaller number of map location questions. The test of geographic knowledge was more similar to exams in regard to the types of information asked and as a result had a higher correlation with the final grade. A more conclusive test of the relationship between quality of the sketch map and grade on the course might have been obtained using maps sketched near the end of the semester, but that remains for future investigations.

The opportunity to improve one's knowledge over the course of the semester was taken advantage of by the female students. This is strikingly illustrated in Table 13 which shows gender differences in map ratings, test scores and final grades. The literature has generally indicated that males do better than females in most tests of spatial ability and geographic knowledge (Cross 1987; Gilmartin 1986; McGuiness & Sparks 1983) and our example was no exception. Matthews (1987) has convincingly demonstrated, these differences are probably not innate but rather the product of differences in experience due to sex stereotyping beginning in early childhood. Our data would provide some support

Table 13

Gender Differences in Test Scores, Class Grades and Map Sketch Ratings

Sex	Mean Test Score	Mean Class Grade*	Mean Sketch Map Rating**	N
Male	74.8	2.3	3.2	46
Female	68.5	2.1	4.2	26
Overall	72.5	2.2	3.5	72

* 1=A, 2=B, 3=C, 4=D, 5=E
**1=High, 5=Low

for this view. For clearly the women in our sample entered the class with a lower level of geographic knowledge as measured both by the sketch map of the world and the NCGE Competency-Based Geography Test. It is important to note,however, that the highest score achieved in the course was earned by a female whose sketch map was rated in the highest category. Furthermore, in spite of this initial disadvantage, other females in the class achieved on the average higher grades in the course than some of the male students who, at the beginning of the semester, had demonstrated higher levels of basic geographic knowledge.

Mathews (1987) and Hart (1978) attribute the gender differential in spatial ability to the greater freedom accorded boys at certain ages. Our study indicates that the lack of interest or experience has serious implications for the amountof geographic knowledge held about the world. For want of experience in neighborhood exploration as young girls, women may later lack basic knowledge about world geography. Clearly the initial level of female geographic ability measured in our sample was neither innate nor irremediable. The great discrepancy between potential and developed spatial ability of the females in our sample may explain why their class grades were higher than would be predicted. In view of their improvement it is obvious they must have applied themselves to the course, but if their spatial abilities were innately inferior their efforts would not have produced such successful results.

Conclusions

According to our data, world sketch maps serve well as surrogates for geographic knowledge of the world. The strongest support is provided by the strong correlation between sketch map quality ratings and scores on the National Council for Geographic Education Geographic Competency Test. Further support is provided by the strong correlation between self-rating of geographic knowledge and sketch map quality ratings.

The relationship between sketch map quality ratings and final course grade, which was signficant in the first sample, did not hold up for the second. This does not mean that the sketch maps do not serve well as a surrogate for world geographic knowledge. The sketch maps were drawn on the first day of class and the course grades were based on knowledge up to the end of the semester, four to five months later. There was a considerable amount of time available for students to improve their knowledge of the world as the women in our second sample demonstrated.

There are great differences between those who sketched the best maps and those who did more poorly. All would agree that schooling, atlases, books, newspapers, television, travel and talking with others are more important sources of geographic knowledge than games and hobbies; and that there are many important sources for geographic knowledge of the world. What seems to distinguish the best from the worst in map sketching and presumably in geographic knowledge, is the range and depth of their sources. The highest rated map sketchers are more likely to use all sources and do so more frequently.

The major implications for geographic education are that students should be encouraged to use multiple sources of information. Even though the quality of geographic education at the primary and secondary levels was not rated well, school was still seen as one of the most important sources of geographic knowledge of the world. This is underlined by the positive correlation between the years of geography at school and the map quality ratings. With more and better geography training at school the quality of the sketch maps improves.

A group requiring special attention is the females. They were consistently lower on all measures of sketch map quality and on the NCGE Geographic Competency Test. According to our sample, women are arriving at university with greater deficiencies in geographic knowledge than men. Clearly there is a need at lower levels of education to stimulate greater interest among the girls in geography and improve their performance.

Our evidence indicates that the differences in the geographic knowledge between males and females evident at the beginning of the year were not innate. The highest grade was obtained by a girl whose map was also rated in the highest category. Furthermore, even though the girls on the average scored lower on the NCGE Test and had lower sketch map ratings than the boys, they did better on the average in terms of final grades.

In regard to male-female differences in geographic knowledge and achievement, it has been fairly consistently recorded that males perform better than females; however, exceptions and paradoxes exist.[1] Among other issues that require further study are the effects of cultural influences that result in boys

[1] The Association of American Geographers' roster lists more women than men claiming cartography as their profession; gender differences appear and disappear depending on the stimuli provided and on the tasks that are examined in the study. Differences show up in some cases based on the country of origin of the respondents (Jan Monk, personal communication, 1988).

being treated differently than girls in terms of expectations placed on them, spatial freedom to explore, opportunities/access to education, and differences in the way boys and girls are treated in the classroom.

Given that the larger political and spatial spheres of action have traditionally been male territories, it is to be expected that females will score statistically lower than males on tests involving spatial knowledge at the world level. However, changing roles and increasing opportunities for women to fully participate in activities having a more global range imply that females must be provided with opportunities not only to develop their spatial skills but also to be socialized into a way of perceiving the world that calls on sharper spatial skills and complete and accurate cognitive maps.

The results reported above are based on samples from one university. Data from our global sample will enable us to examine differences in map sketch quality from place to place and to determine whether these can be explained on the basis of differences in geographical education.

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Appendix A

PAROCHIAL IMAGES STUDENT QUESTIONNAIRE

Name: ______________________ Birthdate: ____________________

Date: ______________________ Sex: ____________________

Major: ______________________ Nationality: ____________________

Minor: ______________________ Religion: ____________________

Thank you for taking the time to help us learn more about your image of the world. Below you will find some questions on your past experiences with geographic information and on the map-sketching exercise. Please answer each question as best you can and return the completed questionnaire when you are finished. All answers will remain strictly confidential.

1. a. In what country did you go to elementary school (Grades 1-6)?

   b. In what country did you go to secondary school (Grades 7-12)?

2. In elementary school, did you study geography as a separate subject or as a part of social studies?

   Separate Subject ______
   Part of Social Studies ______
   Neither ______
   Both ______

   If both, explain.

3. How many years did you study geography in elementary school?

   6 years ______ 5 years ______ 4 years ______ 3 years ______
   2 years ______ 1 year ______ Never ______

4. How would you rate your elementary school training in geography?

   Excellent ______ Very Good ______ Good ______ Fair ______ Bad ______

5. In secondary school (Grades 7-12) did you study geography as a separate study or as part of social studies?

   Separate Subject ______
   Part of Social Studies ______
   Neither ______
   Both ______

   If both, explain.

6. How many years did you study geography in secondary school (Grades 7-12)?

6 years ______ 5 years ______ 4 years ______ 3 years ______

2 years ______ 1 year ______ None ______

7. How would you rate your secondary school training in geography?

Excellent _____ Very Good _____ Good _____ Fair _____ Bad _____

8. Many people have suggested various means of acquiring knowledge about other places. Please rate the following as sources for your knowledge of the world.

	Very Important	Moderately Important	Minor Importance	Unimportant
Formal Schooling in Geography or Social Studies				
Travel				
Books				
Movies				
Magazines				
Talking with People				
Newspapers				
Television				
Games				
Hobbies				
Atlases				
Other (Specify)				

9. Of these factors influencing your geographic knowledge, which do you think were the most important? Why?

10. How would you rate yourself in terms of geographic knowledge?

Very Knowledgeable ______ Knowledgeable ______
Not Well Informed ______ Poorly Informed ______

11. What languages do you understand well enough to read a newspaper?

12. List the foreign countries you have visited? Place an asterisk (*) beside those you have lived in for more than a month.

13. Do you regularly read newspapers? Yes ______ No ______

14. Do you regularly watch TV news broadcasts? Yes ______ No ______

15. Do you own an atlas? Yes ______ No ______

16. Do you own a globe? Yes ______ No ______

17. Do you have any maps on your walls at home? Yes ______ No ______

18. Do you ever look up places that you hear about but are unfamiliar with?
Yes ______ No ______ How often would you do this? Regularly ______
Occasionally ______ Never ______

19. Do you like to play games with a geographic component, such as "Risk"?
Yes ______ No ______

20. Have you ever collected stamps? Yes ______ No ______
If yes, do you still do so? Yes ______ No ______
Have you ever collected coins? Yes ______ No ______
If yes, do you still do so? Yes ______ No ______

21. What areas of the world do you know the most about? Why do you know this (these) area(s) better than others?

We would now like you to think back to the experience you had with drawing the sketch-map of the world.

22. Did you ever do a free hand sketch of the world before? Yes ______ No ______

23. Did you find the exercise easy or hard to do? Easy ______ Hard ______

24. Do you think your map accurately portrayed what you know about world geography? Yes ______ No ______ If no, why not?

25. Did your ability to draw have an important impact on the countries you put on your map? Yes ______ No ______

26. What was your main reaction to the exercise?

____

____

____

Thank you again for participating in this project. If you would like to make any additional comments, please use the space below.

A MODEL OF CHILDREN'S MAPWORK LEARNING

Herbert A. Sandford

ABSTRACT

A model is presented of the manner in which children in a map-using culture acquire a competence in their use, through learning processes that are partly the result of inevitable if slow natural maturation, and partly the result of intentional teaching in the schools. This model is compared with actual teaching syllabuses, and it is found that many mapwork teaching strategies and tactics are given inappropriate weightings, being either under- or over-emphasized, and many relevant aspects are often largely or entirely ignored. From this finding results some practical suggestions for teaching mapwork within geography at school level.

INTRODUCTION

The first in-depth study of the way in which children use maps was made by Sandford in England between 1962 and 1966. As with the more theoretical studies made by Kolacny in Czechoslovakia from 1959, and the wider-ranging surveys by Rushdooney in America from 1960, resourcing the research and publishing its results proved difficult: Professor David Linton, no less, considered models to be irrelevant to geography teachers!

The English study concerned pupils' "free search" (or browsing) of maps, and was followed by a study of their "directed search" (mapwork as instructed). Some methodological and descriptive accounts of these have now been published (Sandford, 1980a, 1980b, 1986a, 1986b). They owe a debt to more recent thought about aims and objectives, though the affective and motor skills of Blum and associates were not considered appropriate foci any more than the acknowledged necessity to spread mapwork across the whole gamut of scale and kind, and for mapwork to rise up from a firm foundation in pre-mapping and map using. These aspects are considered more fully in Sandford (1986b).

Kolacny was the first to be recognized as postulating a model of the cartographic process (Kolacny, 1969). As a producer of school atlases, rather than a "consumer", he appreciated the interplay of reality -- map maker -- map user -- reality, and others followed suite, notably Ratajski in Poland, Morrison in America and Grygorenko in Russia (Sandford, 1986a). Important as these models are, they seem to be more directed at the map maker than at the user of maps.

A more user-orientated approach, however, has been taken over much the same period by Muehrcke, Olson and Petchenik in America, Castner and Head in Canada, Board in England, Bertin in France and Meine in Germany. The main thrust of their combined work is two-fold. Firstly, there has been a proliferation in the number of activities recognized as being performed during map use: searching, locating, comparing, counting and so on and so forth. Secondly, there has been a growing understanding of how these activities may be grouped together and of how they may operate serially. In particular has been the recognition of successive "levels" of map reading and interpretation.

A MODEL OF MAP USE

The model of map use here proposed is based upon the 1960s' research together with some supplementary investigations, and is entirely consistent with the confirmatory findings of the subsequent contextual and lateral work described above.

The conscious starting point could be at the low level of mere perception and apperception - a young boy or girl being impressed by the number of "-stan" names in South West Asia (Afghanistan, Baluchistan, Pakistan and so on) and concluding, through the higher level processes of synthesis and comprehension, that this large continuous area must once have had a common linguistic or even ethnic heritage. Another pupil, asked by her teacher to suggest why the settlers took so long before crossing the Blue Mountains into the richer interior, might successfully analyse the relief shown on the map and remark upon the apparent lack of passes; quite a feat for a youngster, and one backed by a mass of largely unconscious, low-level, perception and apperception. Again, naming places located and locating places named, and their associated scanning and conning, might appear as either early or late steps in mapwork.

Ultimate dual aim (Level Five)

Competence in using maps as a geographical tool.
Competence in using maps out of school and after school.

Although rarely made explicit, such an aim is entirely consonant with the views and statements of Bennet, Graves, Haubrich and Salichtchev. They are achieved through problem-solving experience of five main kinds:-

Pervasive objectives (Level Four)

Locating named places and naming located places -
- finding routes -
  - map conning -
    - map scanning (relatively purposive search)
      - map assimilation, accommodation and application.

Let us explain these pervasive objectives, which I so name as they underlie all mapwork, by means of an example. The class is collecting labels as part of a study of international trade, and one of these bears the inscription "Sardinas Portugesas en Oleo, Setubal, Portugal". With the encouragement of his teacher, the child who soaked the label off the tin locates on the atlas map both Portugal and Setubal and finds a suitable route for the export of sardines to Britain. With further encouragement, the child might con the map and notice that Setubal faces a large lagoon and sand spit, and then, perhaps, by scanning a larger area observe that nearby Lisbon is similarly positioned. The pupil unconsciously assimilates the new data into his information field of the world, his mental map being modified so as to accommodate to this new information. Success or failure is revealed when the child applies his new learning to subsequent mapwork.

These pervasive objectives are made possible only through the application, conscious or otherwise, of a number of facilitating or mediating skill-complexes, as I choose to call them:-

Mediating skill-complexes (Level Three)

Choosing the right map -
- searching the map - (relatively serendipitous scanning) -
  - analysing the map - (including deductive reasoning) -
    - synthetizing the map - (including inductive reasoning) -
      - reading between the signs.

Each and every pervasive mapwork objective necessarily entails an appropriate choice of map, and this map must be searched for relevant data for analysis and synthesis in the light of a comprehension that the symbols cannot be accepted at their face value; they must be "read between the signs", as it were, as Patrick Bailey so felicitously put it. Towns, for instance, commonly being either larger or smaller than the town stamps that represent them on the map.

Behavioural skills (Level Two)

Each of the mediating skill-complexes can be broken down into from just a few to many scores of individual skills required for map reading and interpretation, and most of them are naturally rooted in the apparently simple tasks of perceiving the symbols and apperceiving (or understanding) their meaning.

Only an understanding of typestyles will enable the child to distinguish between the islands and the states in the Caribbean; only handling a globe will enable him to appreciate the peculiar distortions in the Peters' Projection (more correctly called a Gall's Projection after its orginator who published it as long ago as 1855); much experience is needed to distinguish between the contouring of a spur and of a valley, while even the professional is constantly mislead by unequally-stepped contour intervals. These skills are further treated in Sandford (1986b).

Iotic operations (Level One)

Research is only just beginning to uncover the innumerable and largely unconscious operations required to perform the simplest skill. So numerous are these, minute and cryptic, that the term "iotic" seems appropriate. Many concern the physiology of perception; others the psychology of learning; most are cerebral but some are motor. Like Head's "chunking", they may be as fundamental to graphicity as is Reichenbach's "od" to scienticity.

How does our peripheral vision guide our eyes to their interrupted sweeps across the map, and what arrest them successively upon this or that feature? Does the choice of a warm brown to depict uplands really make them stand out from the cool, receding blues of the seas and oceans - or is that but the spurious result of testing boys, for it is boys who tend to notice the mountains and girls the seas?

We are only just beginning to understand something so apparently simple as how we know that an upright line is in fact vertical! So how does a child comprehend a curved contour line, a "figure" (to use the jargan of perceptual psychology) that has to be disinterred from its "ground" of multicoloured point, line and patch symbols; understand it as invisibly joining all contiguous points of the same elevation above a hypothetical average sea level at a distance too remote to be meaningful; comprehend it as part of a pattern of similar contours which only hint of the shape of the land, but which, when conceived as smaller features nesting within larger, can tell a meaningful story of denudation chronology? And even more inexplicable, how does the more experienced pupil and professional geographer take scarcely a glance before pronouncing with surety and certitude, "denuded anticline"?

DISCUSSION

The model of actual map use presented above may be compared with more theoretical statements on what educators believe they ought to do. Biddle reports no generally agreed and constant model of geography as a whole, and Blum's taxonomy, as applied to geography by Cox among others, did not seriously consider mapwork. We must therefore turn to those educators who have drawn up lists of skills and objectives, largely as descriptions of what is or ought to be taught in regard to mapwork, though sometimes supported by research of a kind which largely reflects conventional teaching practice.

Out of Boardman, Catling, Garnett, Gerber, Jay, Macaulay, Orford, Wilson and Winston - and yet others - by far the fullest statement has been that of Barbara Winston, who compiled a list of 226 skills and objectives, partially graded and classified, and descriptive of what is, and of what was considered should be, taught by way of school mapwork (Winston, 1984). For fuller treatment, see Sandford (1986a).

These are all essentially prescriptive, and when they are compared with the model of actual mapwork, they are found to partly or wholly omit some essential, if rather cryptic, mapwork activities. Discussions with practising teachers seem to show that their omission has two main causes. Either they are thought to represent inborn competences not requiring or not benefiting from teaching, or else they have not been recognized as relevant or even present. However, the early studies showed them to indeed be both relevant and amenable to improvement, dramatically so in the case of the higher-level activities of map interpretation but only modestly at the lower ones such as the "simple" psychophysiological processes of preception where there may be rather inflexible innate restraints preventing the acceleration of maturation or even bringing it to a halt.

CONCLUSION

Studies of how children actually use maps lead to a model of map use which contains many elements missing from conventional current teaching despite their being essential to map use, are the occasion of many errors, and are susceptible of improvement. A few of these can find space here.

Children quickly grasp the implications of symbol abstraction, and of technical and editorial exaggeration, which lead many a map to show an undersized town stamp for Brisbane City on a Brisbane River widened beyond all reality. Or rather, they *could*, but only if we teachers did not so often persuade them into a slavishly literal reading of the map, as when we ask how many passes cross the Canadian Rockies, and accept as utterly and immutably correct any answer from "one" to "four" according to how many are named in the atlas out of Crowsnest, Kicking Horse, Yellowhead and Pine.

Children are commonly bewildered and confused by a complex map but are easily taught to study it in "layers" that are both logically and perceptually separable: firstly, the background colours representing the seas with their islands and the lands with their plains and plateaus; then the lie of the routeways between the settlements they serve; then the regions and countries with their frontiers.

Scanning should never be aimless; the mind should be in a state of "attention" which facilitates the instant perception of the required feature or name even if deeply embedded in the ground pattern. With practice, the number of saccadic eye movements may be reduced and the central area of clear vision enlarged: location becomes a swift and certain skill; a holoistic appreciation of areas more suredly achieved.

The geographical co-ordinates of latitude and longitude are all too often neglected during mapwork or limited to their use in locating places. But the pupil may be taught to be constantly aware of their run across the map and so have that ever-present reminder of scale, of orientation, of direction and of position on the globe; can assess local time and likely climate; and can make full correction to any distortion brought about by the choice of projection, which distortion the increasing use of horizontal lettering disguises.

Detailed teaching strategies and tactics for most of the neglected aspects of mapwork have not yet been worked out, though some attempts are made within Sandford (1986b): it is up to the new generation of teachers to complete that task.

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THE EFFECTS OF SELF-DIRECTED ATLAS STUDY UPON STUDENT LEARNING IN GEOGRAPHY

Joseph P. Stoltman

ABSTRACT

The lack of basic geographic knowledge among newly enrolled students in tertiary education has been a frequently addressed issue among geographers in the United States during the 1980s. While the geographic knowledge deficiencies of incoming students have been highlighted regularly in the professional literature and media, there have been few experimental studies in geographic education on which to base corrective measures. This paper reports the results of a research project extending over a four year period during which the effects of self-directed atlas study on student learning in geography were assessed. The study cites the positive growth in basic geographic knowledge among students who completed self-directed atlas study within their general education course.

INTRODUCTION

A keen interest has developed in the United States during the 1980s regarding the extent to which elementary, secondary, and college/university students are knowledgeable about geography. While the focus for the interest has generally been the result of a number of media reports regarding geographic illiteracy among students, additional considerations have also been discussed. First, it is becoming more widely accepted that educated persons should have a thorough knowledge of the geography of the world and their own immediate locale. The world has become a network of closly linked countries, cities, and individuals. And while there is a great deal of curiosity about other places that can be satisfied through the study of geography, the discipline has come to recognize its role in the more important elements affecting an individual's ability to think rationally and make sound decisions as a citizen.

Second, from the viewpoint of cultural transmission, geography has an integral function in the general education that students receive as part of their tertiary education studies. An academic foundation in basic geographic information and concepts provides considerable insight into humanistic studies as well as the numerous other disciplines and issues within the social and physical sciences. Geography as a discipline stands on its own as an important focus of study, and at the same time, it complements other elements of a general education in the humanities, and social and physical sciences.

BACKGROUND

Most students in the United States complete secondary school having little or no course work in geography. This is peculiar to the curriculum structure of American secondary education in general. Students enter tertiary education with little knowledge of the discipline, or for that matter, the world in which they live. That lack of familiarity with geography as a subject of study or a professional field is apparent in numerous ways. For example, when asked to designate their intended subject of major study in tertiary education, secondary students rarely specify geography. That pattern is considerable different from other countries. In the United Kingdom, for example, geography is one of the four or five most popular subjects for students to study (Walford, 1987, 59). In the United States, nearly all incoming tertiary students have little or no background in geography.

The problem of inadequate geographic background that students bring from the secondary school has major implications for tertiary level offerings in geography as a general education course. While students are weak in all aspects of geography, it is 1) knowledge of the locations and characteristics of places at the national to international levels and 2) the ability to use maps effectively as a source for geographic information that immediately become apparent. The incidence of the first problem has been documented extensively in professional publications (Wise, 1975, 477-88; Hill, 1981, 237-45). The second problem, that of using the map as a source of geographic information, has come into focus even more recently as an area of learning deficiency within geographic education. Termed graphicacy, it refers to the student's ability to derive spatial information from maps, photographs, and diagrams (Balchin, 1976, 33-38). The leading professional societies in the United States are currently addressing the major issues in geographical education. While student learning about location and place are a main focus, they have also called attention to reading, interpreting, and making maps as activities essential to acquiring geographic knowledge [Joint Committee on Geographic Education (JCGE), 1984, 2].

STATEMENT OF THE PROBLEM

The problem central to this study was to research the effects of self-directed atlas study on the knowledge of world place characteristics among first year university students. That problem is of significance in geographic education for two reasons. First, general knowledge about location and place are essential to a general education. Both location and place have been cited as fundamental themes in the Guidelines for Geographic Education (JCGE, 1984, 3-4). Second, within a tertiary level general education geography course there is generally not adequate instructional time for a major component of lecture and class time to address the basic elements of location and place. Therefore, it may be desirable for the students to undertake the development of a background in those aspects of geography using self-directed atlas study.

EXPERIMENTAL TREATMENT

The investigation of the effects of a self-directed atlas study was planned as an experimental treatment. The rationale for the experimental treatment was based upon established principles in research that the effects of the self-directed atlas study upon student learning would be readily discernible using standard assessment techniques such as a pre and post evaluation. The treatment period was fifteen weeks in duration for the students involved in the self-directed atlas study project.

The students were assigned forty seven self-directed atlas activities to complete using a widely accepted secondary/university level atlas (Espenshade and Morrison, 1986). Each activity devoted attention to the location of places and the determination of the physical and human characteristics of those places using information from the atlas.

The format for the self-directed atlas study activities was consistent throughout the experimental treatment. The students were provided with a focus statement, a reference list to the map sheets in the atlas that would be helpful in completing the activities, a set of three to five learning objectives to direct the students' attention to information of major importance, a lists of materials required, an outline map of the region being studied, a list of significant places, and a set of problem solving exercises requiring the student to locate significant places within the larger geographic context of environment, natural resources, transportation, etc.

RESEARCH DESIGN

A pre and post repeated measures research model was used to design the project. The repeated measures model required that the students be administered a valid, reliable measure of their ability in location and place characteristics knowledge at the beginning of the treatment and be readministered the same or an equivalent measure of ability at the conclusion of the treatment. The strength of the pre and post design is that within a specified level of confidence (probability) the effects of an experimental treatment, such as the self-directed atlas study, may be singled out from the effects of independent variables, such as travel experiences, reading preferences, familiarity with atlases, etc. It is important to verify that other elements have not intervened during the period of the experimental treatment. In the present study, those controls were applied through the use of a pre and post treatment questionnaire.

A widely accepted statistical procedure for analyzing the data was selected for the design. It was the Repeated Measures Analysis of Variance. That procedure permitted analysis of the pre to post variance of measurement scores within groups as well as the analysis of variance between subgroups of the sample using personal survey results as independent variables.

DATA COLLECTION

Data regarding pre and post knowledge about place characteristics among the students in the experimental group were collected using the Map Location Test II (Khan, 1986, 315-320). The instrument was judged to be valid for the self-guided atlas study activities. Just as importantly, an acceptable coefficient of reliability was reported from the experimental use of the instrument during several research applications (Khan, 1986).

Pre and post treatment data were collected for three hundred ninety seven students enrolled in a general education geography course between 1984 and 1987. The students were in their first year of tertiary education. In addition to the pre and post tests, personal information was collected, including a list of prior courses and experiences that might affect performance on the self-guided atlas study. Included were surveys of the time expended completing the self-study atlas activities each day, enrollment in elementary and/or secondary school geography, concurrent enrollment in another tertiary level geography course, and student's general use of local, state, national and world maps.

SAMPLE SELECTION

Since the pre and post data collection had included every student enrolled in the general education geography course, it was desirable to apply a sampling procedure to that population. For the purposes of analysis, a random sample of 126 students was selected from the population of students enrolled in the class. An additional subsample of thirty students was randomly selected from the sample in order to analyze more closely the effects of selected independent variables upon the students' responses to the treatment.

RESULTS OF THE EXPERIMENTAL TREATMENT

The comparison of the pre and post measurement data revealed an eighteen point increase in mean scores for the sample. Pretest and posttest means of 31 and 49 were observed. That change in means was significant at greater than the .99 level of confidence. The data suggest clearly that a major improvement in basic geographic knowledge and the ability to use maps had occurred with the experimental group.

In order to investigate more closely the effects of treatment, a sample (n = 30) of students from the same population as the experimental group and who were enrolled in a comparable general education geography course, but did not participate in the self-directed atlas study, was administered the pre and post measurement. The mean score for the comparison group was 30.5 on the pretest and 34 on the posttest. While the scores on the pretest for the experimental and comparison groups were similar, the post test scores were different in favor of the experimental group at greater than the .99 level of confidence. The basic hypothesis that the self-directed atlas study had a significant effect upon the learning by students in the study was accepted.

Within the research sample, pre to post test score differences were also investigated using the following independent variables: 1) time spent on the self-directed atlas study; 2) prior geography courses in elementary, and secondary school and/or concurrently in tertiary education; 3) self rating of ability using maps; and 4) gender of the subjects. Twenty seven students from the larger sample completed personal surveys and maintained records related to their individual interactions with the self-directed atlas study. They comprised the research subsample.

In the subsample, students were asked to maintain a record of the time in clock minutes they expended daily in completing the self-directed atlas study. Those results were then grouped into four categories ranging from less than thirty minutes to two hours. While all students made significant gains, there were no differences in the pre to post measurement gains based upon average time expended on a daily basis in completing the self-directed atlas study. It was interesting to note that the one student spending the least amount of time daily attained the greatest absolute gain in score. The student attributed it to a preference for that style of learning. Other students explained their time expenditures as that necessary to complete the work they had embarked upon for that day, or the time necessary to learn the material covered in the self-directed atlas study. It was the time element that highlighted the individualized approach to learning, with students adjusting their time commitment to correspond with the student-atlas interaction necessary to learn the material.

The effect of prior or concurrent courses in geography on pre to post measurement scores was analyzed. Within the subsample, all the subjects reported they had studied geography in the elementary school. Map study, local community studies, and the United States were mentioned with regularity as topics. Fifteen subjects reported they had not studied geography nor was geography a part of the social studies they studied in secondary school. Twelve subjects reported they had studied geography as social studies. In the analysis, prior studies had no significant effect upon the pre to post measurement changes within the subgroup. The limited amount of geographic study among the subsample was not surprising. The data analysis further suggested that the geographic learning carried over from secondary school to tertiary education had no significant effect upon the outcomes of the self-directed atlas study.

Self rating in the ability to use maps was the independent variable that provided several interesting insights to the individual student interacting with the self-directed atlas study. In analyzing the within group effects of self rating upon pre to post measurement scores, there was an observed interaction at greater than the .80 level of confidence. While not statistically significant, the effects suggest that students with a higher self rating brought to the self-directed study an individual assurance in their ability to complete the learning task. This is especially interesting since there were no differences between the high and low self rating groups on the pretest, but the posttest scores for the high self raters were slightly better, although not significantly higher.

The final within group analysis used the treatment group sample of subjects (n = 126). That data analysis focus upon a long standing issue in geographical education, that being the effects of gender upon spatial learning. In recent years, it has become recognized that perhaps the spatial experiences of females and males are received and subsumed differently both in a cognitive and social sense. Both topics are beyond the scope of this paper. The current research, however, was interested in the effects of treatment, and an interesting pattern emerged. Table 1 presents the Repeated Measures Analysis of Variance based upon the treatment by gender. While women recorded lower pre and post measurement mean scores than men (Table 2), the absolute gains as a result of the self-directed atlas study were greater for women than men. The data suggest that perhaps the spatial experiences of women do not prepare them in the same fashion for learning geographic knowledge and atlas usage. However, once they experienced the self-directed approach and its style of spatial learning, women students demonstrated more rapid gains in acquiring basic geographical knowledge.

Table 1

PRE POST REPEATED MEASURES ANALYSIS OF VARIANCE

GENDER X REPEATED MEASURE

Effect	SS	df	MS	F	P
Gender	2884.52	1	2884.51	21.33	.01
Error 1	16766.91	124	135.21		
Repeated Meas.	18030.72	1	18030.72		.01
G X RM	732.38	1	732.38		.01
Error 2	4468.35	124	36.03		

Table 2

Table of Means and Standard Deviations

Variable	Mean	StDv	N
Female Pretest	27.14	8.85	71
Posttest	47.63	8.35	
Male Pretest	37.40	12.07	55
Posttest	51.02	7.45	

CONCLUSION

The research study was concerned with identifying and analyzing the effects of self-directed atlas study upon the student learning of basic geographic information and map usage skills. The changes as a result of self-directed atlas study in basic geographic knowledge and map usage skills were significant. Self-directed atlas study is an effective way to have students build basic geographic information and skills backgrounds without detracting from or taking time from the normal content delivery in general education courses in geography.

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MAPS AND MAP SKILLS

Joop van der Schee

ABSTRACT

The purpose of this article is to give information about maps used in the Dutch geography curriculum in secondary schools and about the skills of Dutch grammar school students in using maps to solve problems in a geographical way. The research results presented about the latter suggest that it may be desirable to give more attention to the development of map analysis skills in geography teaching. But at the same time more variation in the supply of maps and map assignments seems to be necessary.

INTRODUCTION

How important maps are is shown in Il Nome della Rosa (Eco, 1980). To solve the murder cases in a North Italian monastery, the main characters have to fathom the secret of the library which is a labyrinth. They gain insight into the labyrinth after having made a map of it (see figure 1). "Not inside the library, but outside we will solve its problem", says the Sherlock Holmes of the book. The division of the library is a reflection of the world map as it was known in the Middle Ages. For instance, Anglia and Germania are in the northern part of the labyrinth. The murderer is exposed in the southern part of the labyrinth in a room without doors which is discovered by analyzing the map.

Maps show a lot of data in one look and in that way make it possible to discover certain spatial patterns and spatial variations. In order to see patterns and relationships the skill to read maps alone is not sufficient. More important

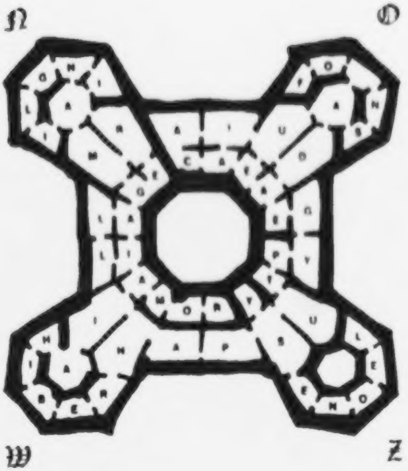

Figure 1. Map of the labyrinth (Eco, 1980)

than map reading is, according to Muehrcke (1974, 52), insight 'beyond map symbols'. To understand maps one must have map analysis skills at one's disposal.
In this article we will first give an impression of the number and types of maps used in Dutch school geography. Then we will turn to the map user. Without map analysis skills the map user is handicapped, even if the maps are perfect. Finally, some conclusions will be drawn with respect to maps and map use based on the results of an empirical investigation into the use of geographical cognitive skills by students in secondary education when analyzing maps.

MAPS IN DUTCH SCHOOL GEOGRAPHY

The Bosatlas is the most used Dutch school-atlas. An investigation of the number and type of maps in the last editions of this atlas shows some remarkable changes (Geerlings et al., 1981, 8). After 1960 the number of maps grows explosively: from 161 maps in 1959 to 482 maps in 1981. This is due to the growing number of thematic maps: from 118 maps in 1959 to 446 maps in 1981. The number of outline maps is almost constant. This reflects the developments in geography. Geography used to be a discipline describing nations and countries, but after 1960 geography became more and more concerned with the analysis of themes within regional contexts. The Bosatlas now presents Dutch geography students with a considerable number of thematic maps. This is useful for at the final examinations in geography in secondary education students must have map skills at their disposal.

But do these exams test map skills? The occurrence of maps in examinations for the highest levels of secondary education was investigated by Hengeveld (1986). She found that of all the assignments in the examinations in the period 1977-1985, one quarter related to maps. More than 50% of the maps however were monothematic. These research results give a quantitative idea of the supply of maps and map assignments in geography examinations. They do not tell us what type of geographical exercise the map user has to carry out. Information on this point is scarce as far as examinations are concerned. But in 1984 the two most used Dutch school geography books for the first three years of secondary education were investigated. The 280 thematic maps and connected map assignments in these books were classified with help of key concepts which are related to the geographical method (Van der Schee, 1985, 425). It appeared that a lot of attention was paid to the concept of spatial distribution and less to the other geographical key concepts (see table 1). This is not only true for the information provided in the maps, but also for the map assignments. Besides, table 1 clearly shows that students do not get training in map use on all supplied maps.

TABEL 1 THE NUMBER OF MAPS AND MAP ASSIGNMENTS IN DUTCH SCHOOLBOOKS IN 1984 AND THEIR KEY CONCEPTS

Key concepts	Number of maps	Number of map assignments
Spatial distribution	185	111
Spatial association	51	56
Spatial interaction	27	11
Spatial diffusion	13	9
Spatial system	4	6
Total	280	193

MAP SKILLS

The investigations mentioned above seem to show some shortcomings in the supply of maps and map assignments in Dutch school geography. The most important question, however, concerns map skills. Over 200 students between the ages of fourteen and seventeen from five grammar schools in the Netherlands participated in a research project on map skills (Van der Schee, 1987). These students can be expected to have certain geographical cognitive skills for analyzing maps after three years of geographical training. The investigation was restricted to the use of thematic maps, because this type of map contains a specific meaning, which requires the user to employ analytical skills. The purpose of the tests was to see whether the students could discover spatial patterns in the maps and what kind of concepts related to the geographical method were most problematic for them to handle when solving problems by map analysis. Figure 2 depicts an example of a simple distribution map from the student

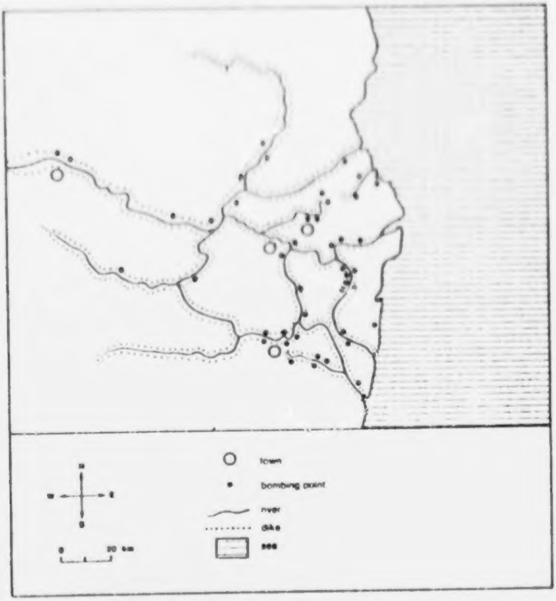

Figure 2. Map of American bombing points in the Red River delta, May-August 1972 (Lacoste, 1977).

materials of the research project. This map was taken from Yves Lacoste's famous article about the bombing of the dikes in North Vietnam (1977). Along with the map students were given information about differences in relief between the eastern and the western part of the Red River delta. The American administration denied that the attacks were deliberately concentrated in the eastern part of the delta, where most of the villages are located below the level of the rivers. The students were asked to give their opinion about this statement. By studying the spatial distribution of bombing points on the map and recognizing the spatial association between relief and bombing in the area, it is possible to give an opinion about the question whether there is foul play at stake or not. On this assignment 58.1% of the students were able to analyze the map correctly. It is important to know that in the assignments a fictitious setting was used to avoid the influence of knowledge or opinions students might already have.

Apart from maps with spatial distributions and spatial associations, maps with spatial interaction and spatial systems were used in the research materials. Figure 3 is based on a map of traffic intensity near Puebla in Mexico. This map was used to investigate how many students would recognize the relationship between volume of interaction and distance between places. Given the information on the map the students were asked to indicate the volume of taxi traffic between towns P and Q and between towns F and G on the map and to explain their method. Only 11.5% of the students succeeded.

The total research results show that students have more difficulties in recognizing spatial interaction patterns than spatial associations on maps (see table 2).

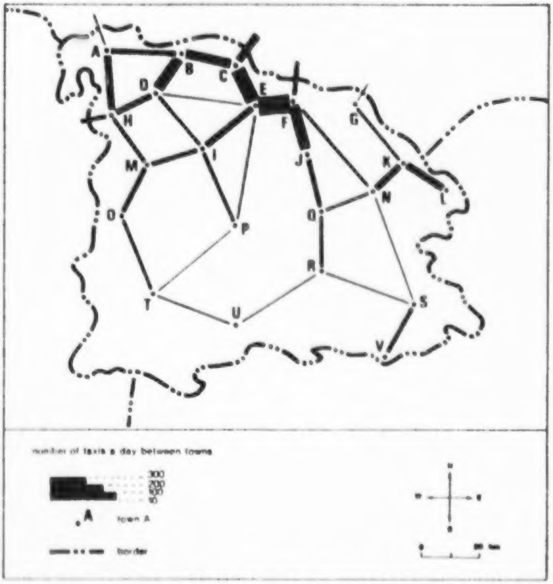
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V
number of taxis a day between towns
300
200
100
10
A
town A
border

Figure 3. Map of traffic intensity between towns.

TABLE 2 AVERAGE NUMBER OF POINTS ON THE PARTS OF A TEST ABOUT MAP ANALYSIS SKILLS (n=203)

	average	st.dev.
Spatial association	65.09	25.50
Spatial interaction	39.07	16.60
Total	49.48	15.38

DISCUSSION

The subject matter (Posner and Strike, 1976, 670) in geography teaching consists of three aspects:

* knowledge about phenomena, resulting in facts like 'Amsterdam has two universities';
* knowledge about conceptual systems, such as the theory of city structures of Burgess or Hoyt;
* knowledge of the inquiry process by which conceptual knowledge is produced.

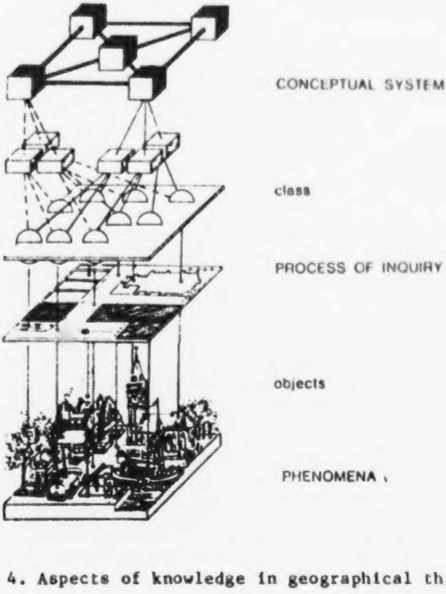
CONCEPTUAL SYSTEM
class
PROCESS OF INQUIRY
objects
PHENOMENA

Figure 4. Aspects of knowledge in geographical thinking

Map reading, map analysis and map interpretation are closely connected with the three aspects of geographical knowledge mentioned above. Phenomena are identified and named in the phase of map reading. In the next phase of map analysis these phenomena are ordered systematically. Finally, in the phase of map interpretation, this spatial order will be explained with the help of existing factual knowledge and conceptual knowledge (Van der Schee et al., 1988). So map analysis skills are related to the skills of students in using concepts which are connected with the method employed in geography to order phenomena and to interpret them (see figure 4). From the map analysis research it turns out that it may be relevant to give more attention in Dutch geography teaching to the use of maps that depict spatial interaction and spatial systems, because in order to gain insight into the spatial structure of present-day society, it is essential to be able to detect interaction patterns within and between areas. Especially in a country like the Netherlands, which would not even exist without external relations (the Netherlands belong to the top ten in world trade). It is striking that spatial interaction is represented in only 10% of all maps in the most used Dutch geography school books.

CONCLUSIONS

> "A major goal of education must be to dispel the misunderstanding and mistrust about other people and other regions. Emancipation in this field can be reached by a regional geography that takes in account that all particular phenomena are parts of complex wholes, interacting within those wholes to reproduce and change them" (Johnston, 1987).

In order to understand the character and dynamics of areas and phenomena in areas on different spatial levels, maps are indispensable. In geography teaching students have to be trained in map use to gain a differentiated knowledge about the world they live in. Therefore high standards for maps and map assignments in schoolbooks and atlases are necessary. Thinking like a geographer can be stimulated by systematic training in reading, analysis and interpretation of different types of maps.

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REALISTIC IMAGES IN DEVELOPING THE MAP READING SKILL

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ABSTRACT

The map reading skill is very complex. Before maps, with their coded symbolic contents, can provide pupils with right associations of the reality, numerous ideas as well as elementary skills must be mastered. My survey has indicated that the student's ability to imagine the surface of the earth on the basis of maps is not satisfactory. To develop pupil's spatial imagination can be achieved, among other things, with the help of illustrations. The search of text books content has shown that sets of illustrations with maps are rare and often insufficiently justified. It is necessary to identify students' difficulties in this field and to find the methods to avoid them.

REALISTIC IMAGES IN DEVELOPING THE MAP READING SKILL

Maria M. Wilczyńska-Wołoszyn

INTRODUCTION

The process to develop the map reading skill is very complex. Before maps with their coded symbolic contents, both in scale and from top view, can provide pupils with right associations of the reality, numerous ideas as well as elementary skills and habits must be mastered. To find out the substance of the students' difficulties in this respect special investigations have been carried out. Particularly interesting was the analysis of the student' answers to the exercises in which they had to imagine the area presented in the map.

SUBJECT, MATERIALS AND METHODS

To eliminate the factors connected with the student's individual features (differentiation of abilities, reasons, character, etc.) and his milieu, a specific group of students have been selected. Namely, the finalists of the Geographical Contests, which are organized for high school students interested in geography. Every year 500-800 students average take part in such contests. They come from various social milieus and are trained by various teachers; nevertheless they are asked the same questions and are evaluated according to one instruction. The questions to all the stages of the contests are worked out by the special commission composed of outstanding geographers and geography didactitians from all over the country led by prof.dr. Jan Flis. After succeeding selections in the first and second stages around 70-80 best students are qualified for the all-Polish final. Since the whole high school programme of geography is required at the contest the participants usually come from the highest levels, that is the third and fourth ones. Hence 90% of them are 18-19 years old. Taking into account their age, interests, self-dependence in preparing for the contest and the fact that they have won at several previous stages, the level of the participants' knowledge of geography can be regarded as to be the pupil's maximum ability in the present system of geography education. In spite of their undoubtedly deep knowledge, great difficulties, the students had with the problems in question, have also been observed.

RESULTS

The first two items were to ascertain and justify, by means of the contour map, whether a given mountain peak can be seen from a given view pointing reality. In both cases another mountain was located on the sight line. The results in both groups of finalists were similar (fig.1). The problem was

Fig.1. STUDENT'S RESULTS IN TASKS NO. 1 AND 2

Answer category	task 1		task 2	
	number	%	number	%
Correct answers	23	28,4	16	22,8
Partly false answers				
- argumentation was not correct	25	30,9	20	28,6
- lack of argumentation	5	6,2	13	18,6
False answers	24	29,6	14	20,0
No answers	4	4,9	7	10,0
total	81	100,0	70	100,0

solved only by 23% and 28% of the finalists who explained their conclusion by the proportion between the height and distance of the given objects by means of a drawing, calculation or description. A considerable number of the finalists (37% and 47%) answered that the mountain could not be seen; a few participants, however, presented no explanation, whereas the majority of them explained it in a wrong way. In most cases the pupils justified their answers only by the difference of height among the three top points; sometimes a drawing was presented, with the obstacle wrongly placed, half way between the objects. The remaining pupils gave wrong answers for they could not imagine the given situation in reality. It shows that neither the proportion of the distance was taken into account nor the elevation between the objects was noticed.

The insufficient ability to imagine the surface sculpture of the earth on the basis of a contour drawing became particularly visible in the third problem: the finalists were to draw contours every 10 meters on the grounds of numerous height points (Fig.2).Among 70 finalists, 11,4% did not know the

Fig.2. STUDENT'S RESULT IN TASK NO.3

Answer category	number	%
Correct answers	38	54,3
Partly false answers:		
- 1-2 height-points not included in proper contour line	10	14,3
- 3 and more height-points not included in proper contour line	14	20,0
Entirely false answer or no answer	8	11,4
total	70	100,0

rules of interpolation for they linked the height points accidentally or did not solve the problem at all. 54,3% linked the points with proper contours, whereas 34,3% of the finalists gave partly wrong answers (they did not link some points with proper contours).

To draw interpolation in a mechanical way was not enough to solve the problem properly for, beside the height point three of which were height tops, there were also three streams drawn. Such an arrangement of height points and streams made one imagine a probable shape of the hills and valleys. It turned out that the students had less difficulty to render the shape of the elevations than that of valleys. The elevations were rendered correctly by 42,9% - 45,7% of the finalists . In other cases either no solution was given or the answers were entirely wrong (11,4% - 15,6%). The mistakes consisted mainly of the improper placement of contours, unjustified complication of contour shapes, and mechanic interpolation of points. The achieved image of the surface sculpture of the earth in this scale (1:10 000) and contour section resulted in bizarre irregular slopes and improbable elevation shapes.

When rendering the shape of concave forms, that is valleys the pupils faced even greater difficulties. The participants were given relatively good marks for rendering the shape of a valley where the contours had to be curved owing to the placement of height points (31,4% answers were correct). The poorest results were achieved when there were no height points near the stream (only 8,6% were correct). A great number of the finalists did not draw the valley at all (from the 15,7% in the simplest case to 57,1% in the most difficult one). The examples of the wrong answers are as follows: streams intersected by contours in the way that they had to flow alternately upwards and downwards, valley drawn beside the stream which means that the stream flows along the slope, and contours curved in the opposite side, suggesting that the stream flows on the ridge. Most often, however, the streams were intersected at the right or acute angle or finally, contours were curved unequally (34,3% - 52,9%). It points out to the fact that some of the pupils are not able to imagine by means of a contour drawing, the most natural ways along which water flows.

The last set of problems consisted in identifying various geographical objects (mountains, valleys, localities) in a realistic drawing presenting a part of the area covered by a topographic (tourist) map. Only 24,3% of the finalists (Fig.3) were able to identify all the objects correctly. Around 37% of them failed to give answers at all or did it incorrectly. In the partly false answers there also occurred some identifications mistakes, resulting from the wrong elevations in relation to their distance from the observer.

Fig.3 STUDENT'S RESULTS IN TASK NO.4

Answers category	number	%
Correct answers	17	24,3
Partly false answers:		
- false identification of one part of view	15	21,4
- false identification of two parts of view	13	18,6
Entirely false answers	18	25,7
No answer	7	10,0
total	70	100,0

The results are not satisfactory both in case in which the student had to use his imagination when applying only a map as well as when he could use a map together with realistic image. They reveal that even the pupils with a deeper knowledge of geography find it difficult to imagine the surface sculpture of the earth on the grounds of maps.

Such skill can be develop only by comparing the map contents with the reality during outside classes and excursions. This method, however, bears great limitations. The majority of landscape types are not accessible to direct observation. The student's idea of these landscapes can be formed indirectly, mainly through realistic pictures, photographs, and drawings, as well as symbolic images, ie. maps. The common function of both sources of information accounts for their importance in developing spatial imagination which is essential to reconstruct the landscape on the grounds of maps.

The importance of realistic images in developing the map reading skill was presented in my paper at the Congress of the International Geographical Union in Paris (M.M.Wilczyńska, 1984). Suggested illustrations, such as landscape sketches, profiles and blockdiagrams, were first meant to illustrate also the area observed directly. The emphasis put on the differences among the direct observation, indirect one and map reading was to awaken the student's imagination when he could use maps only. Further suggestions concerned the use of both illustrations and maps of the area inaccessible to direct observation. The material for such exercises has been already included in school books. Moreover, the development of photointerpretation as scholarly method can cause that there will be included more frequently sets of maps with illustrations in school books and atlases.

In order to define the usefulness of such comparisons and to determine the changes in this field the analysis of all the school books and atlases in Poland for both the old and actual educational programmes has been carried out. However, the total number of such comparisons is not very high. The old school books and atlases contained 30 of them, whereas the new ones 55 (M. Krasnodębski, 1987). The comparisons of illustrations with maps can be characterized in view of their similarity with the landscape observed directly. The closest to direct observation will be the comparison of the photograph with a blockdiagram. This group also includes realistic drawings and artistic paintings, providing that they present the reality from the eye-level or diagonally from a higher point, the latter practice being frequent in the mountains. Blockdiagrams include the drawings that present the reality with a three-dimensional effect. They usually cover a larger area than a photograph, therefore they are in a different scale; they also differ by the view-point (generally higher than that in the photograph); the orientation of direction is also different. Such comparison type is not very frequent in school books (the old ones contained none, whereas the new ones only nine examples).

Far more frequent is the comparison of a photograph with a plan or large-scale map (13 in the old books and atlases, 20 in the new ones). Here the comparison of the contents of the two sources of information is more difficult. Quite frequently the sources differ in scale, generalization level, direction and view point. It is only in the case of air and satellite photographs that their elements will coincide with those of the map. Possible difficulties may arise from little discernity of landscape details in photographs taken from big height.

The comparison of blockdiagrams with plans and big-scale maps provide a similar generalization level and, similar scale (even in the case of small-scale maps) but different view-points (horizontally down in maps and diagonally from the side in blockdiagrams). Therefore, they are of particular help when students have to pass from one spatial presentation to another. Unfortunately, the books and atlases contain hardly any of such comparisons (3 in the old books and 6 in the new ones).

There is a relatively big group of comparisons pair photographs with small-scale maps. There are 14 examples in the old books, 20 in the new ones. In view of the development of the map reading skill, however, such comparisons are absolutely useless. They eliminate any comparison of the contents. Because of the great scale difference between the photographs and maps, the nearest object marked on the map remains invisible to the observer.

CONCLUSIONS

As seen from the above presented results it is necessary to develop pupil's spatial imagination which is essential for map reading. This can be achieved, for example, with the help of illustrations. The comparisons of illustrations with maps are still rare in school books, though their number is growing. They are , however, quite accidental and often insufficiently justified. A teacher cannot find any didactic suggestions in the literature on the subject, since it deals with illustrations and maps separately strictly dividing their functions.

The present paper presents briefly a problem that has been revealed in the course of the examinations of the students' in skill reading maps. The subject is to be continued in order to identify the students' difficulties and to find the ways of overcoming them.

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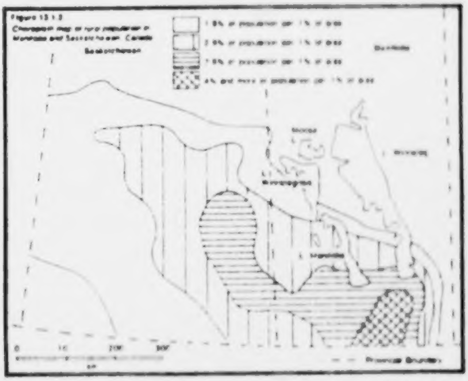

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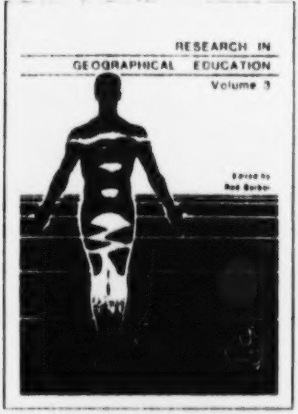

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